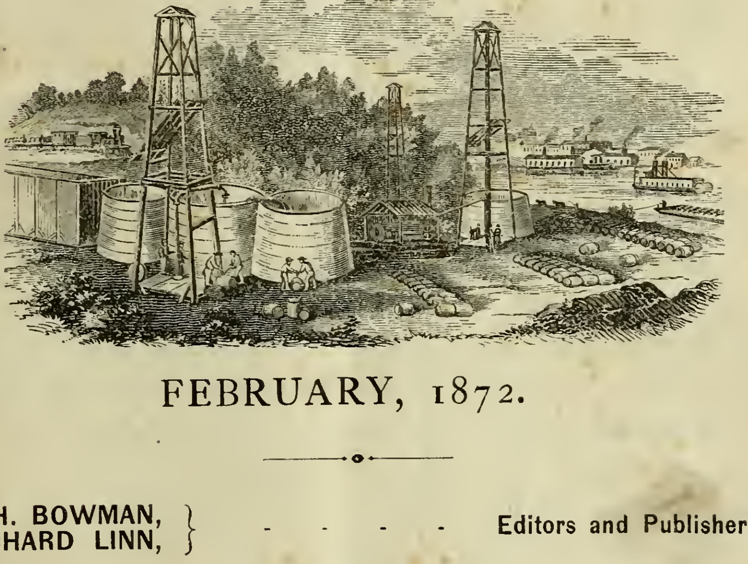
Vol. II. No. 2.

THE
PETROLEUM MONTHLY,

DEVOTED TO THE

INTERESTS OF THE OIL BUSINESS.



FEBRUARY, 1872.

J. H. BOWMAN,
RICHARD LINN, } - - - - Editors and Publishers.

OIL CITY, PA.

TERMS:

THREE DOLLARS PER ANNUM IN ADVANCE.

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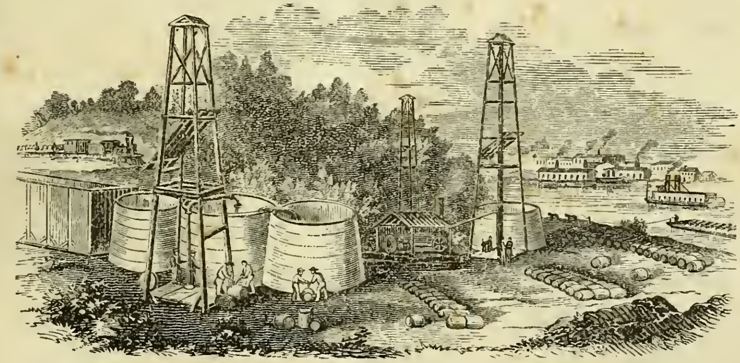

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Yours Truly
J. T. Jones

THE

Petroleum Monthly.

Vol. II. FEBRUARY, 1872. No. 2.

J. T. JONES, ESQ.

ONE of the most remarkable business features of the oil regions, and one which is calculated to arrest the attention of an observing stranger, is the many prominent positions, worthily won and worn by men, young in years, but capable and experienced in their business. It may, perhaps, be that the energetic, hopeful and daring spirit of early manhood is peculiarly adapted to this precarious pursuit; nevertheless, the fact stands unquestioned, that the oil trade of Pennsylvania, so far as its production is concerned, is mostly in the hands of young men. Our purpose, in this article, is to present a short biographical sketch of one of these gentlemen, whose life has been filled with many strange and eventful incidents.

Joseph T. Jones, of Rouseville, was born in the city of Philadelphia, June 11th, 1842. His father died when Joseph was aged but six months, and his education devolved wholly upon his mother, a lady eminently qualified for the trust thus cast upon her. Under watchful maternal influences Mr. Jones attained his seventeenth year, when he went to an uncle's to learn the trade of a stair-builder. While thus employed, the voice of war roused the nation to arms, and young Jones responded to the call. In September, 1861, then only nineteen years old, he enlisted in Gen. Gregory's regiment, the 91st Pennsylvania, and by his good conduct and personal bravery won, although unsupported by political influence, position after position until he reached the rank of captain. A singular fact in his case was that every promotion was in response to a petition from the men, and not the result of personal favoritism. At the battle of Cold Harbor, June 3d, 1864, Capt. Jones, then commanding two companies, was wounded in both feet, the ball passing through the right and resting among the tendons of the left foot. After lying some time in the hospital he was mustered out, September 25th, 1864, by reason of disability from wounds, after having been in service three years and two weeks.

The savings from his pay, made during these years of severe toil and danger, Mr.

Jones invested, on his return home, in oil stocks, which proved highly advantageous. Determining to make the production of oil his future business, he came to Rouseville in February, 1865, where, shortly after, he put down a well which proved a "dry hole." Still undaunted he drilled another, and another, until thirteen wells, all in succession, had proven failures. In fact, so proverbial had his ill fortune grown that the name "dry Jones" was applied to him by some facetious neighbor. "Go in with Jones if you want a dry hole," was the admonitory remark of almost every person in that locality.

The difficulties, however, only nerved him to renewed exertions. Depressed but not dispirited he bored again. This was his first triumph, and as if to make up for past ills, Dame Fortune crowned with success his succeeding efforts, for, he had fifteen strikes without a single failure. In prosperity, as in disaster, his well balanced mind was preëminently conspicuous. Although soon in receipt of an income of over two hundred dollars a day, he stood his tour upon some of his wells, and worked with his accustomed energy, superintending the whole business himself, thus getting daily but a few hours' sleep, for many months, until actually attacked by a spell of sickness. Upon his recovery he determined that, as his business had grown so extensive, he would devote his entire attention to a general supervision of his numerous wells. But even now, when a casing has to be drawn, or a torpedo exploded, he is always present and active. Mr. Jones' success has caused a reconsideration of the term "dry," once applied to him, and now it is said, "Put a well down with Jones, and you are sure to get oil."

In his personal habits Mr. Jones is peculiar. He drinks no tea, no coffee, or chocolate; eats no butter or cheese; uses no tobacco; has never morally dissipated; has the first glass of intoxicating liquor to drink as a beverage, and has never played a game of cards for money in his life. This is more strange when we consider his term of service in the army, and the temptations surrounding a military life.

His mind is strictly mathematical, which is, if we accept the *dictum* of Charles XII., the highest order of intellect, and he has highly cultivated its peculiar bent. He is methodical, and so thoroughly does he understand and arrange his business that he can give you a circumstantial history of every well that he owns or is interested in. He is a clear reasoner, having a large portion of that faculty denominated common sense, which, by the way, is a *misnomer*, for it is the most uncommon sense of all. Added to this, he is full of energy and personal bravery, and it is said of him that he never failed to carry any point he had resolved upon.

These facts were obtained from Mr. Jones in personal interviews, in which he never suspected the use that would be made of them. But surely, he is, take it altogether, a most extraordinary character, and one calculated to stimulate and encourage youths to proper exertions, and as such we offer it to the public.

H. G. A.

AMONG THE OIL WORKS OF SCOTLAND—NO. II.

YOUNG'S PARAFFIN OIL COMPANY'S WORKS, ADDIEWELL.

AFTER a run from Glasgow of about thirty miles, and an easy walk, let our reader imagine himself perched about half-way up on one of the numerous chimney-stacks in the vicinity of the candle warehouses at Addiewell, and he has around him a bird's-eye view of probably the largest oil works in the world. On either side—behind and before—there are objects connected with these works which, both as to extent and importance, might furnish material for half a dozen interesting pictures. But as it is impossible to compress about seventy acres of buildings, retorts, condensers, store-tanks, pits, railways and workmen's cottages into a single sketch, our readers must be content with the selection of what we consider the most interesting points that can be compassed in one view. By the courtesy of Mr. Hill, the highly esteemed general manager of the company, we were introduced to the various departments, both at Addiewell and Bathgate, and were privileged to witness the manufacture of paraffin oil and the various products connected with it, upon a scale of extent and regularity of which none but those who have seen for themselves can form any adequate conception. As, however, we are at present giving a series of articles upon oil-making, which will convey a tolerably good general idea of the various processes of manufacture, it would be little else than superfluous repetition to describe in detail the perfected arrangements which these works presented; but it would be an act of singular injustice to say that both Addiewell and Bathgate works do not possess novelties peculiar to themselves. At the same time it would be equally unfair to make patent to the world any special results of labor and skill, which in these days of keen competition it is desirable to keep back as long as they contain any elements of commercial advantage. Anyhow, the limited space at our disposal for this notice will not allow us to enter upon the description of elaborate details which constitute either the mechanical or chemical points of difference. We may, however, mention one novelty without having the least fear that we are committing a breach of confidence—the enormous extent and producing power of the works of this company. In this respect Young's Paraffin Light Company out-distance all their rivals, and it is not too much to say that the extent of their operations, their command of capital, and their excellent management have greatly contributed to give to the various products of their manufacture a fame for quality and regularity which appears to be well deserved. The burning oil especially—which has, perhaps, more than any other product contributed to the reputation of this company—has for many years past been held in high esteem, on account of its reliable uniformity and safety; and the company are always anxious to impress upon dealers that it requires no license. At Aiddiewell (which is under the able superintendence of Mr. R. Scott) we have followed the shale from the railway wagons and seen the huge blocks crumble into pieces between the ponderous wheels of the crusher, performing its task with the regularity of clockwork to the tune of 3,000 tons per week; we have watched the retorts charged and emptied, and examined the multifarious processes of distillation and treatment till the ugly irony shale blocks were converted into beautiful, limpid burning oil, into lubricating oil, or into delicate, wax-like candles—some as white as alabaster, others tinted in the most beautiful colors—all ready for the various markets; and yet, amidst the complicated system of pipes and conductors (some underground, some over)—amid tanks innumerable—smoke that almost could be felt—flaring gas and hissing steam—apparatus for heating, cooling and freezing—amidst all this apparently bewildering complexity there was no confusion.

Every man appeared to know his work thoroughly: could tell where every pipe led to, and what every cistern contained, and (as directly as it was possible to obtain an instant reply from a Scotchman) was able to give the why and the wherefore to every question. To any one of our readers who may be fortunate enough to obtain the opportunity of a ramble through the works at Addiewell, we say, do not miss so rare a treat. It will perhaps be remembered that the present Limited Company came into possession of these works—and also those of Bathgate—in January, 1866, having purchased them from Mr. James Young, the original patentee of paraffin oil. The capital of the company is £600,000. The directorate presents a rare combination of shrewd mercantile experience and scientific knowledge; and doubtless the energy and tact with which the management in chief has been thus supplied have brought this company to its present prosperous condition, notwithstanding that since its formation many depressing circumstances have assailed the trade generally. The mineral fields of this company are said to extend over a large tract of country, and to give evidence of an abundant supply of shale for many years to come. At present there are some fourteen or fifteen pits open, and the proceeds of these are conveyed, by a system of branch lines, into the very center of the works, and from one works to the other, as required. At Addiewell there are 354 retorts, with the capacity to extract the products from over 3,000 tons per week. This is equal to a weekly yield in crude oil of 120,000 gallons.

The capacity of the refining department is of corresponding extent, and is capable of turning out in burning oil alone about 70,000 gallons per week. To this we may add some 5,000 to 10,000 gallons of lubricating oil, about thirty tons of refined parraffin, and some twelve tons of sulphate of ammonia. These figures present a tolerable sum total for one refinery to produce in a single week, and convey some idea of the importance of this mineral industry to Scotland. The total number of workpeople employed at Addiewell is 1,600, of whom 850 are shale miners—men and boys—and the aggregate of persons dependent on the company is about 3,500. The wages paid by this company in one year are said to reach very nearly £100,000. The works at Bathgate being near to the village, at least partial accommodation for the workmen was at hand, though, since the manufacture of paraffin oil began in earnest, it is interesting to note the rapid increase in population. At Addiewell some 500 houses—a whole village—had to be erected by Young's Company for the convenience of workmen and their families. And it is to their credit that while the fathers are toiling away down in the dark vaults of the earth, where Nature has so long hid her shale, the company have not left the rising miners and refiners to wander wild and uncared for on the cheerless heath. They have erected an excellent school, superintended by a master and mistress, two assistants, and four pupil teachers, and attended by about 250 children. There is also a capital store which it is our pleasure to note is not conducted upon the truck system—so common in Scotland—and over it a large hall capable of holding some 600 people. With all these facilities for comfort and improvement, it is not surprising that Young's Company should gather around them a class of skilled workmen, so conducive to the success of any establishment.

The works at Bathgate are under the management of Mr. Robert Lavender, lately of the Belvidere Works, Kent. They have 240 retorts, and refining power considerably beyond what these produce in crude oil, so that while they can distil into crude oil somewhat over 1,500 tons of shale per week, they can turn out of refined products about 50 per cent. more than this quantity of shale would yield. At these works is produced the popular burning oil known as the "White Horse" brand, in addition to the company's usual qualities. In every other respect the products are the same as at Addiewell, excepting that no candles or mixed lubricating oils are made at Bathgate Works. The number of *employees* is 550, and, as no mining is done here, these are all engaged in the manufacture of oils and paraffin. The works being older, and constructed as the various departments of the manufacture were developed, are scarcely so well arranged as at Addiewell. They are, nevertheless, interesting as marking off the most important epochs of this wonderful trade from its infancy; yet, while retaining these characteristics, they give evidence of having been brought to a high state of efficiency under the present management. Altogether, our visit to these works afforded us a rare pleasure, viewing them either as objects of scientific interest or as large producers of commercial products of the class in which we are specially interested.

It is almost needless to remark that this company is well represented in our most important commercial centers, having no less than nine branch establishments—viz., London, Manchester, Birmingham, Bristol, Hull, Newcastle, Edinburgh, Aberdeen, and Dublin—besides resident agents in France, Denmark, and Scandinavia; the whole being under the control of the Registered Office, St. George's place, Glasgow.

HOW PARAFFIN OR COAL-OIL IS MADE.

CONTINUED FROM PAGE 8.

AFTER the oil has undergone the usual amount of agitation, it is left undisturbed for about twelve hours. By this time the acid and tarry matters, or impurities, which it was the purpose of the acid to separate from the oil, subside to the bottom of the agitator. The oil, being of lighter specific gravity, meanwhile rises to the top and occupies the upper portion of the tank. The latter is then carefully drawn off and passed into a second agitator, where, after the addition of about 4 per cent. of a solution of caustic soda, of the strength of about two pounds of caustic soda to a gallon of water, the agitating or stirring apparatus is once more set in motion. The object of this further agitation is to separate any impurities that may have been left by the first process. After this the whole is allowed to stand seven or eight hours, during which time the oil as before rises to the top, while the soda and any further impurities settle to the bottom. The oil is afterward drawn off and has to undergo a second distillation, this time in an iron still with about half its bulk of water. As the distillation proceeds, it is necessary to add still further supplies of water in small quantities successively, in order to replace a certain quantity which unavoidably escapes in the shape of steam. The point which we have now reached has brought us to a part of the process of oil-making of special interest to the trade, because it is in this distillation that the liquid is separated into distinctive marketable products. Of course the lighter and more volatile portion—that which possesses the lowest boiling-point—passes over first. This is regulated by the specific gravity—that is to say, the liquid as it passes over and is condensed is closely watched, and all up to a certain specific gravity (the latter, however, varying somewhat with the nature of the shale) is passed into a tank to be sold as spirit—shale spirit. Then comes the burning oil. But it is perhaps well to puase here, in order to interpose a word or two in regard to the *safety* of the burning oil, and to show how entirely it is at the will of the manufucturer to make it safe or unsafe. The spirit or more volatile product being of less commercial value than the oil, acts as an inducement to any unscrupulous refiner to separate too little spirit from the oil, as, by leaving it in the oil, he can obtain a higher price for the illuminating product; but the short-sightedness of this policy has become so apparent, that there is scarcely any fear now that any of our home producers would be willing to risk their reputation for such paltry gain as could be derived from an extra two or three per cent. more spirit being left in the oil. Anyhow, the manufacturer, whether of coal-oil or petroleum, has the matter of safety in his own hands; and it is in proportion to the point in specific gravity (the nature of the crude material being allowed for), when the spirit is shut off, and the liquid is allowed to flow into the oil tank, that the burning product is made to stand a high or a low test as to inflammability. Were more attention paid to this subject by American refiners, there would be little need for the restrictive measures which it has been found necessary to pass, not only in this country, but also in other countries, in regard to the otherwise excellent, and, notwithstanding this, popular, burning product of American petroleum. To return to our subject. After the more volatile portion has been removed, the liquid is passed into a separate tank, and is ready to be barrelled and distributed to the consumer as paraffin oil. It is now considered to be in the highest state of perfection as to illuminating power. Of course, it varies in color, and also in odor, according to the quality of shale, and also sundry details in manipulation; but it is sometimes subjected to still further treatment, either with chemicals or by means of bleaching-tanks, in order to further lessen the smell and give it a whiter appearance, though this last process is only resorted to in order to meet the fancy of consumers in certain districts, and in no case that we are aware of does it improve either the burning properties or the safety of the oil. We may here remark that we have never considered it a wise policy to persuade the public that the whiter the oil was the better it burned, and the greater was its value as an illuminating product. To make it water-white always entails labor and cost, which is never compensated by any corresponding improvement in quality. As a rule, however, the whitest oil fetches the best price upon the market.

We have thus far referred to only two products—spirit and burning oil—both of which find a ready sale in our home markets, besides being extensively exported. But the remaining products are also of great commercial value.

THE HEAVY OIL

being rich in paraffin, which is eagerly bought up for the manufacture of candles. The oil itself, also, after the paraffin has been extracted, forms an excellent lubricant, which is, however, greatly improved by, and indeed is now much more extensively used in conjunction with, certain proportions of vegetable oils. Pure mineral lubricating oils are prepared in this wise: The heavy oil, after the removal of the spirit and burning oil, is transferred from the still to a tank, where it soon separates from the water that had been mixed with it for the purpose of distillation; it is then drawn off, and reconducted to an agitator, into which is also put about 2 per cent. of sulphuric acid. After it has been agitated for a couple of hours, it is allowed to settle for about twenty-four or thirty-six hours, and is again drawn off into another tank. Here it is mixed with ground chalk and water, made into the consistency of a paste, and in the proportion of a quarter of a hundredweight of chalk to 100 gallons of oil. The machinery is again set in motion, and the mixture—oil and chalk—well agitated for some time, the object of this process being to remove all traces of sulphuric acid. When this has been accomplished, it is left undisturbed for about a week, by the end of which time the separation may be considered complete, and the oil may be drawn off ready for the market. In our next number we hope to show how paraffin is extracted from the oil and made into candles.

"THE GREAT FIRE AT CHICAGO AND WHAT CAUSED IT."

UNDER this speculative caption the *London Oil Trade Review* devotes a leading article to the discussion of low-test burning oils. This article is of such sterling worth that we give it our readers at some length. The only error in the premises of the *Review*, is, that the Chicago fire did not originate in the thoughtlesness of Mrs. Mulrooney's cow in kicking over the kerosene lamp. It wasn't a lamp at all, it was a candle, and the cow didn't kick the candle over, for there was not any cow there, neither was there any candle.

These trifling inaccuracies are entirely pardonable, owing to the fact that the statement first appeared in the American papers, with the portraits of both lamp and cow gazing demurely upon the ruin wrought, and the *Review* not knowing the erratic proclivities of the illustrated press, very naturally fell into the error, so common to strangers, of believing their representations of such matters to be faithful. But that is neither here nor there. The statement concerning the cow has brought down upon petroleum the curses loud and deep of all who know nothing of petroleum, and has taught to the wise this lesson—that they cannot be too careful in their selection of the refined petroleum they burn in their lamps. That the conflagration was not kindled by the breaking of a lamp does not gainsay the fact that the breaking of a lamp *would* kindle a conflagration, even as disastrous as that, one other thing being equal; provided always, however, that the oil in the lamp was such as is now almost universally burned throughout the Western States. For let it be here remarked, that in the oil regions proper and in the States east of us the oil burned is of a much better quality than farther west, with the single exception of New York city, where the poverty of the lower classes compels the use of the cheapest, which is of course the most dangerous. We have never known or heard of a *lamp explosion* in the oil regions, where refined petroleum is burned to the entire exclusion of any other illuminator, excepting alone in two cities which are supplied with gas, but which gas is even there in but few houses. The reason is obvious—here we understand its use and are generally good judges of its quality. Long experience has made us so. To a close observer provided with a nose of ordinary intelligence, nothing is easier than to detect dangerous oil.

In the Western States the people are frequently and fatally the victims of two delusions, which conspire to murder and rob them *ad infinitum.* They believe that petroleum is, if not a product of the infernal regions, at least something akin to it, and producers and speculators but a degree removed from devils—delusion number one. They believe that *kerosene* is and only can be *kerosene,* and that without grades of better or worse, and the cheaper the better—delusion number two.

And so with this double delusion, is it not a great wonder that more accidents do *not* happen, and more lives are not lost, and more property burned? We have before us a newspaper called *The Journal of Light and Health,* published in a Western city, and published in the interests of a patent "oil" called Sunlight Fluid. The proprietors of this fluid tickle the fancy of Western people by a salutatory devoted to the abuse of petroleum, and assure them that there is not a drop of petroleum in a barrel of their "fluid." With this argument, gratifying their natural hostility to petroleum, and the possibly stronger one that it, the fluid, can be bought for one-half the price of *kerosene,* they established a heavy trade in "fluid" and county rights to dispose of it, and in a few days five thousand persons were using it in one city, and with what results we need not chronicle. Suffice it to say—and we record it with a degree of satisfaction—the good people of that city were a few days ago called upon to deposit in their rich prairie soil, aloof from the sunlight, all that was left of one of the enterprising proprietors of the "fluid," after an attempt to convert his non-explosive "fluid" into a prime article of sunlight. But we return to the original argument. Had the lamp been filled with oil of a proper fire-test—say 130 degrees—then the more the cow kicked the more the oil would not burn. The oil manufactured by Downer, of Boston, for example, is almost as safe under such circumstances as lard-oil.

And the time will come when such oil and such alone will be used. We give place with pleasure to the following from the *Review:*

"This brings us at once to the cause of the Chicago fire—the upsetting of a kerosene lamp. As most of our readers well know, kerosene is a name extensively used in America to designate what in this country we call rock oil and crystal oil, or, as some prefer to call it, 'petroleum of commerce.' Now, regarded either in the aspect of commercial importance or as a great public boon on account of its brilliant and economical light, there are few substances of greater value than petroleum. But, somehow or other, a concurrence of circumstances seems to have conspired to bring this valuable commodity into disrepute—not but that petroleum will outlive all the opposition that may be heaped upon it. Chicago, like Havre, Antwerp, Santiago and Bordeaux, may soon lose its thrilling effect upon the mind; but if we can show how the probability of a similar disaster may be considerably reduced, we shall be doing the trade and the public real service in the long run. And we must not flinch from exposing any system, however unpleasant the task, which is likely—

indeed, which has already proved itself—to be the active source of many fires of lesser magnitude.

"Naturally, there is no subject in which we are more interested than petroleum—*i. e.*, kerosene—and no article of commerce that we would sooner see free from every hinderance, popular or legal, to its full development. But we are bound to speak out, even when we find that the worst enemies of this trade are those of its own household, We speak of those who are doing their best to bolster up the continuance of the trade in low-test and unsafe oils. What we want to know is, Why should risks be run with oils of low and positively dangerous test, when they can be made perfectly safe? The notions that if they are made safe they won't burn, or that the process would cost too much, and they would in consequence be excluded from the market, are confined to those who are ignorant of the subject, or are partisans of the importer for the sake of gain. In this respect science has to weep for some of her children—and we fear that she is seldom otherwise than in tears. But lest it should appear that in thus writing we have any special interest in view, whereas we write, not in the interest of any section, but of the trade as a whole, we are painfully happy in being able to refer to the very nursery of the petroleum trade as supplying interesting material bearing directly upon the subject. Chicago is not alone in fires caused by low-test oils. Dr. Chandler, in his report to the Metropolitan Board of Health, New York, 1870, thus writes:

> The terrible accidents continue to occur, though, since the public has been so earnestly cautioned by the Board of Health, they do not seem to occur as frequently as formerly. Several heart-rending accidents have occurred in the Metropolitan district during the past year.
>
> Fire-Marshall Brackett reports during the year ending October 31, 1869—
>
> | | |
> |---|---|
> | Total fires in New York | 913 |
> | Fires caused by kerosene | 98 |
>
> This is equal to 17 per cent. The damage to property by the kerosene fires was 72,720 dollars.
>
> In Brooklyn during the same period—
>
> | | |
> |---|---|
> | Total fires | 311 |
> | Fires caused by kerosene | 31 |
>
> Equivalent to 10 per cent.
>
> During the year 1869 I cut from the one morning and one evening paper, which I regularly read, the records of—
>
> | | |
> |---|---|
> | Deaths from kerosene accidents | 52 |
> | Serious injuries | 50 |
> | Slight injuries | 6 |
> | Total | 108 |

"In thirty-seven cases there was considerable damage to property; in eleven, slight damage.

"One notable feature of these accidents is the fact that the victims are generally women or children.

"The Petroleum Monthly, in referring to another journal which has made its appearance at Pittsburg, the capital of the oil district, thus remarks:

"We are glad to note the fearless, independent spirit of the editor, and the evident power in his attacks upon the dealers in low-test burning oils. *The sale of these dangerous combinations is assuming the most startling proportions, as the results in the fearful sacrifice of human life, by lamp explosions, fully testify.* And the *Journal* will be appreciated and sustained by all who value the safety of themselves and families, and understand the dangers constantly incurred, and the suffering entailed, by this crying evil—the manufacture and sale of these low-test oils.

"We are ever ready to take the field in support of the trade in any position which can be honorably defended; but when we find any section of it pursuing such a suicidal policy as is practiced by dealers in unnecessarily inflammable oils, we are bound to protest, in the name of humanity and of those whose best interests are bound up in its success, against a system so needless and pernicious. Dr. Chandler shows, in the report, that a very small percentage of spirit extracted from the oil would render it perfectly safe, and he also tells us why the spirit is not extracted:

"Every refiner can send a perfectly safe kerosene to market if he chooses; he may make it stand fire at 110°, 120°, 130° Fahr., or any other temperature he may elect; it is merely a question of a few cents more or less per gallon. Consumers should understand that in demanding the cheapest oil they compel the refiners to supply them with a mixture of benzine and kerosene.

"The conscientious refiner runs all the dangerous oil into the benzine tank, and only when the oil is sufficiently heavy does he allow it to pass into the "kerosene" receiver. But as the benzine must be sold at a lower price than burning oil, the refiners are, many of them, led to collect as little benzine and as much kerosene as possible.

"The cupidity of the refiner leads him, therefore, to leave as much benzine in the kerosene as possible, regardless of the frightful consequences which result from frequent explosions.

"To meet the remark that if high-test oil is insisted upon it would be excluded from the market, the *New York Bulletin* supplies important information, to the effect that, since the passing of the late State law prohibiting the sale of petroleum with a fire-test below 130° Fahr., so many manufacturers commenced refining high-test oil that the market is not only abundantly supplied, but has a large surplus; and oil sufficiently high in test to meet every requirement of the law is now as cheap as the low-test oil so fruitful in mischief. It is important to note that with high-test oil, should a lamp be purposely upset, the effect would be to extinguish the light. We have seen a record of many experiments made with a view to test this. But, on the contrary, with oils of a low igniting point the result has nearly always been, when the liquid came in contact with the lighted wick, to inflame instantly. We trust, therefore, that our legislators will not wait for the bitter experience of our friends in the States before we have a more satisfactory code of regulations, insuring greater regard for public life and property. One praiseworthy feature in reference to Chicago is this—that our countrymen have come forward with the most unbounded liberality in contributing of their abundance to mitigate the enormous losses caused by the late disaster; and amongst them we are pleased to notice the names of several firms who are deeply interested in the importation of petroleum into this country. But it must not be forgotten that, though monetary help may be of great assistance in reinstating property, in imparting impetus to trade, and in assuaging the sufferings of the bereaved, no amount of money can recall life or obliterate from the memory the harrowing scenes which entitle Chicago to the darkest page in the history of kerosene fires. In a word, we venture to think there is more than the bare probability that, had the liquid in the lamp which was kicked over by the unlucky cow been oil of high test, similar to most of our home makes, or like the safe kerosene manufactured by Mr. Downer, of Boston, and some other well-known makers, Chicago might have been yet sitting in her queenly pride, with her garments uncharred and her homes unburned; and the busy hum of commerce might to-day be heard in her streets, which but yesterday were crackling in the fierce embrace of flames, and filled with the sound of lamentation and bitter wailing."

Pursuing this same subject, but with the same inaccurate premises, Professor Attfield writes to the London *Times* as follows. We need only explain that *colza*, as referred to by the professor, is an oil expressed from the seeds of a species of cabbage, and much used in France and Belgium for illuminating purposes:

"Accepting this statement of the origin of the fire as true—and the frequency with which fires are kindled, afloat and ashore, by the new mineral oils is unquestionable—what conclusions should be drawn and what lessons learnt? Nay, to ask a more practical question, how does the public stand respecting knowledge and ignorance on the subject of fires? That some substances are combustible, that some combustibles burn more readily than others, and that any combustible material catches fire sooner under certain conditions than it does under others, are facts well and widely known and insensibly acted on by us in the management of households, warehouses, and such structures.' We rightly allow only metal and air to be in immediate contact with our domestic fires and flames, we take more care of gas and spirits than we do of candles and coals, and we know that curtains hanging from a pole are far more easily fired than curtains folded and stored. To willful or thoughtless neglect of one or more of these points is most generally to be traced the cause of a fire; but not always. A person may have occasion to handle a material of whose relation to fire he is ignorant; or, knowing that the thing handled is combustible, a man may be ignorant of its relation to other combustibles. This latter is the present position of the public, abroad as well as well as at home, respecting those mineral oils which during late years have been so largely used for illuminating purposes, and which now and again cause fires of lesser or greater magnitude. The degree of inflammability of colza and the other old vegetable oils is fairly well known. They cannot easily be fired, except on a wick, and even then a flame must be applied carefully and for some little time. On the other hand, everybody who uses them knows that common spirits and naphtha catch fire in a moment; these, therefore, are handled, stored and employed with adequate precautions. But the mineral oils, though much nearer to spirits than to the old oils in their degree of inflammability, are treated by the public as though belonging to the latter class. The mistake could not well have been avoided, for these mineral liquids are more closely allied to oil than to any other class of fluids; they are used in the place of oil, and hence have come to be sold by oil-men and purchased by consumers under the name of oil. Doubtless the public will in time learn that in relation to fire these substances are of a spirituous rather than an oily nature. We may then expect that fires started by mineral oils will result from carelessness or willfulness, and not from ignorance. Meanwhile Parliament, the press, men of science and oil traders must do their best to contribute to the removal of this ignorance. Parliament has already done something and promises to do more. It is now in Great Britain illegal to sell the more inflammable kinds of mineral oil, properly termed petroleum spirit and paraffin spirit, unless every vessel is labeled as follows:

'Great care must be taken in bringing any light near to the contents of this vessel, as they give off an inflammable vapor at a temperature of less than 100° of Fahrenheit's thermometer.'"

But petroleum oil, as at present sold in England, gives off inflammable vapor at temperatures very slightly above that just stated. Paraffin oil is less inflammable than petroleum oil, but both take fire with the utmost readiness compared with olive, sperm, colza, and other vegetable oils. I would implore petroleum merchants, and oil dealers generally, to endeavor to import and supply petroleum oil which shall be *less* instead of more inflammable than paraffin oil. From my own experiments and experience, I venture to assert that this could be done without injury to the illuminating power of petroleum, and if effected gradually, without the slightest risk of the British paraffin oil driving the American petroleum out of the oil market. Indeed I am of opinion that public confidence in petroleum would be so much increased that a still larger trade than ever would be carried on in that important article.

The Government has undertaken to amend the Petroleum Act next year, more particularly as to the way in which the inflammability of the vapor of the mineral oil is to be ascertained. Perhaps the cause of public safety from fire would be usefully served by the insertion of a clause rendering obligatory the employment of a caution-label on all vessels containing any kind of mineral oil, the label of the present act serving as now for petroleum spirit and paraffin spirit and one drawn in simpler and less alarming terms for petroleum oil and paraffin oil.

From the whole matter the public must conclude that its present position respecting the relation of mineral oils to fire is one of ignorance, and therefore of danger. The sooner this ignorance is dispelled by enactments of the legislature, full discussion in the press and the occurrence of fires—which, let us hope, will never again approach the fearful nature of that in Chicago—the sooner shall we arrive at a time when fires kindled by mineral oils will not be more frequent than those started by other combustible substances. That they are more frequent I think no disinterested person will venture to deny.

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DUALIN EXPLOSIONS IN LANCASTER COUNTY.

A NEW explosive compound, known as Dualin, is just being introduced to the public, and which, in its terrible power, completely eclipses nitro-glycerine or any known explosive. The dualin is in the form of a powder, resembles fine pine saw-dust coated with oil, and is packed in paper cartridges of from five-eighths to six inches in diameter. The ingredients of which it is composed are a secret of the inventor and manufacturers, the latter being the Laflin & Rand Powder Company, of 21 Park Row, New York. The general agent of the house is Mr. Morgan Emanuel, a Pennsylvanian, but at present located at 170 Broadway, New York. This gentleman arrived here on Wednesday evening, bringing with him a quantity of the dualin for the purpose of making some experiments, or rather to demonstrate its power as an explosive. The extensive blasting which is now in progress on the Columbia and Port Deposit Railroad, a short distance below Safe Harbor, furnished an excellent opportunity to thoroughly test it, and yesterday he proceeded to that point, accompanied by a number of railroad contractors and others interested. Among the party were Col. E. McGovern, John McGrann, James C. McGovern, contractors, and Major R. W. Shenk, President of the Lancaster and Reading Narrow Gauge.

The party arrived before noon, and shortly afterward the experiment began. The first was in a side rock, where a drill two feet in depth had previously been made. In this was placed less than a half pound of dualin. The object was to show that it would not explode without concussion, and hence, instead of tamping or the use of powder, a stout hickory pick handle was driven in with a sledge, and the fuse ignited. When the fuse touched the dualin a bright flame and a wreath of white smoke issued through the crevice, but no explosion followed, and the pick handle was drawn out considerably charred. The same quantity of the compound was again placed in a drill, a little blasting powder put on the top and the charge well tamped with a hickory stick. The fuse was ignited, and in a few seconds—just time enough for the party to get out of the way—the explosion followed, and a shower of rocks seemed to darken the air. Large pieces, weighing from fifty to a hundred pounds, were carried to a considerable distance into the river. The rock was not only burst to pieces, but large fissures were made at the bottom of the drill—a feature which we believe no other explosive possesses.

Experiments were also made in block blasting. This consists of rendering such masses of stone as have been detached from the main body—and, by the way, the entire bluff on the river bank seems one continuous limestone rock—and which cannot be moved by any power at command. With a comparatively small charge these were blown to fragments. After several experiments of this nature, it was announced that a drill four feet in depth was ready. This was on the side of the bluff, and a charge of six inches of dualin was put in and tamped. When the charge was exploded another grand shower of rocks occurred, and, on examination, it was found that an excavation had been made in the bluff large enough, when the debris was removed, to put in a small house. The mass of rock which was torn out and broken up was immense.

But the most remarkable incident of the day, and one which excited the greatest interest as establishing the tremendous power of the dualin, was an experiment in surface blasting. On a detached rock weighing, it was estimated, about six tons, was placed a cartridge containing two pounds of the compound. This was covered with a half-bucketful of sand and trampled down with the feet. The end of the fuse was inserted in a copper cap, a little larger than an ordinary gun cap, when the fuse was ignited. The explosion that followed was quick, sharp, and resembled the detonation of rifled artillery. The rock was broken to fragments, and, what was most singular, portions of it burnt so that it crumbled between the fingers like dried clay.

All the experiments proved satisfactory, and the experienced gentlemen who witnessed them regard this new explosive as possessing greater power than any of which they had any knowledge or ever heard of. It is said to be as safe as powder. At all events, Mr. Emanuel seemed to have very little fear of it when preparing a blast or in handling it.—*Lancaster Express.*

The *New York Herald* describes a series of experiments made with this explosive on a section of the New York and Boston Railroad, near Tarrytown, Westchester county. The various tests instituted for the purpose of evolving the properties of this latest chemical achievement and its relative force as compared with gunpowder were conducted under the direction of Mr. A. C. Rand (representing the Laflin & Rand Powder Company, of New York), in presence of several gentlemen, who included among their number representatives from the iron mining districts of Pennsylvania and some prominent railroad contractors.

In order to demonstrate the non-explosive nature of the compound indicated without the aid of a fulminator, a keg packed with the material was elevated by a derrick to a height of about sixty feet, and then allowed to fall on a rocky surface. The concussion produced no more effect than would have followed had the keg been filled with common earth. As an evidence of its extraordinary utility in submarine work, a broken package was thrown carelessly into a pond of water, and sank with the aid of a large stone, having first been connected by means of a wire with a powerful electric battery. On being fired it exploded with tremendous force, almost completely lifting the entire body of water into the air and tearing away the earth for a distance of several feet at the bottom where the package, containing not more than half a pound of the dualin, had been deposited. A similar quantity, when placed on the surface of an immense boulder, having been first covered with a little earth, was exploded with the fulminating cap by electricity, blowing the adamantine rock to atoms. A moderate charge of powder tamped into a hold six inches deep had previously blown out without affecting the solidity of the stone. Other satisfactory experiments resulted in a similar manner. The effectiveness of the dualin as compared with powdei was fully proved by placing an ounce of the latter in a mortar loaded with a ball weighing over fifty pounds. On the charge being fired the ball rose lazily in the air to a height of perhaps not more than twenty-five feet. An ounce of dualin was then carefully weighed and placed in the mortar underneath the ball. The battery having been applied the iron missile was sent flying toward the clouds, reaching an altitude of at least four hundred feet.

The dualin in appearance resembles pulverized vegetable matter, and is a remarkably light substance. On coming in contact with fire, whether the quantity of dualin be large or small, it burns rapidly with a fierce flame, evincing no explosive features whatever. A box filled with the compound was thrown into a bonfire, and, on being ignited, passed off in a volume of flame, leaving the receptacle almost intact.

An object of much interest to those present was a powerful drill, which can be driven either by steam or compressed air. This wonderful machine is capable of drilling a hole five inches in diameter in the hardest rock at the rate of eight feet per hour. An important feature of this machine is the "air cushion," which takes the recoil of the blow struck against the rock, thus avoiding the terrible wear of the mechanism developed in the use of other percussion drilling machines. With such agents as dualin and the drill alluded to, the removal of rock cannot fail to be materially facilitated.

Laughing Gas.

TO appreciate the following, it will be necessary for the reader to recall his readings of *Dante's Vision*, as in fact the greater part is unchanged quotation from that admirable poem. It is really wonderful that anything on earth could suggest, much less receive, the application of his startling lines. This application is laughable, and our good citizens of Parker's Landing need not now or ever fear that a trip to their quiet but busy town will suggest what is here portrayed by a nervous poet in the winter and spring of 1870.

A Nervous Poet at Parker's Landing.

DANTE'S VISION MODERNIZED.

CANTO I.—ARGUMENT.

History repeats itself. Dante paid a visit, as was the custom at the time, to the oleaginous districts of the Caspian Sea. The rich deposits of naphtha in the valleys of Ghilan and Mazanderan, which tempted the cupidity of Zingis Kahn, in the beginning of the thirteenth century, leading to the conquest of the country, were known by fame, even in sunny Italy. From Reshd to Amal the poet finds in his journey the river Irak-Baropomisan, whose tide and scenery bear no mean resemblance to our Alleghany. Upon this there rests the base of his famous vision.

Venango City, ss.
This well remembered duty first performed
And cash for paste-board fair exchange here made,
We seek convenient quarters in our coach.
Shriek after shriek now rends the murky air,
The iron horse impatient trots away
And home is left behind. Then Socrates,
With due complacency, each paste-board takes,
And mildly whispers not to fear—that Virgil waits
At Parker's, there our true behests to obey.
With onward rush and roar, the intervening space
Our hungry steed devours, and we soon
The end attain. One agonizing scream and snort—
The brakes applied—and 'mid conductor's shout
And brakemen's oaths sublime, we tumble out.
England's invader-like, we prone upon
Our stomach fall, and take possession of
And bear away a goodly portion of the lands.
Here Virgil (shade magnanimous) appears—
A sooty rascal he, as Afric e'er produced—
Our satchel takes, and points beyond
The roaring flood; and grinning, whispers,
"Ober dar?" and with my nod leads down
The treacherous steep. And Charon now, demoniac form,
With face of burning coal, the color beckon on
And with his oar persuasive, punches up
The straggling ones. Upon the pilot-house a card
Appears, and I, in haste, approach; for here
I certain am to find these words:—
"Through me you pass into this land of sin;
Through me you pass into the stygian pool;
Through me, among the people lost for oil,
Parker, the founder of my fabric is, and
Hunter, of renown, doth run me now. * *
All hope abandon ye who enter here."
These words, I found to my disgust, did not appear;
But in their stead, the Virtues—not of those
Who here abide, for such, I learned, have
Long removed from hence—but of a compound
Sure to cure a cough or kill a worm; while
Scattered here and there, "Torpedoes," "Leases," and
So forth, et cetera, I beheld, and trembling much;
Whereat I thus: "These words impart hard meaning!"
My Nig, as one prepared, replied in substance:
"Here you must all dark distrust behind thee
Leave. Here be vile fear snuffed out. We are come
Where I have told thee we shall see the souls
To misery doomed, who stick their cash into
The earth and get no oil."
And when his hand he had stretched forth
With pleasant looks to mine and said,
"A dollah, sah!"—the filthy rag received—
Led on. Thus safe beyond Acheron's tide
Transported, landing made and stood
With Virgil on the treacherous soil,
A look about me cast. We on a narrow

Ledge or beach appeared. Before us frowned
An awful height, whose rugged face
Of rock was furrowed deep with many
A seam; and many a rocky wart stood forth
With threat'ning aspect. Huge hemlocks gaunt
And soot-begrimed, stretch forth their arms
And sigh for ropes to dangle thence
And by the necks support the forty thieves
Whom "Short-stop" drove from Titusville, and
Other hundreds here, whom doubting Providence
It seems and scoffing at religion
To let go unhung. But more of this anon.
Our way we onward wend along the base
Of this dark cliff. Below rush madly on
The woful tides of Acheron—at lowest ebb
A kindly stream enough—now hurrying on
With crash and roar and surge, which echo
Finds among the rocks above. Wild war
Is waged between its thunders and the groan
And rattle of a thousand buzzing demons,
Engines called, and wildly working
Pump or drill. Gigantic see-saws,
Equipoised atop a sampson-post, and
Brandishing aloft alternate ends, whereto
Are pendant swung the engine and the
Oil well, forces forth the nasty wealth
Or drives the clanking steel still further down.
Adown the narrow street the contraband,
My Virgil—who of Æneid never dreamed—
With chattering jaws and eyes protruding waded
On. I close behind, all trembling as I came,
And groaning 'neath the mass of mud which
O'er me poured as wagons dashed at
Jehu pace, and horsemen, frantic, galloped
On. Anon the steep and tortuous way before, we
Climb, and on the summit stand.
The Logan Farm,
Lawrenceburg, and Runs of Mike and Tom,
With Foxtown in the distance, all appear
Like maps before me spread. Beneath my feet
Acheron rolls. The barque which constant
Plies a busy trade, and stems for stamps
The raging flood, goes hurrying to and fro.
Its freight the sorriest sinners of the earth
Are found. And ever they on this side landed,
On the opposing bank a throng still gathers.
"Massa" (thus spake the ebon rascal
By my side), "those who are subject to
The wrath of God and fear the violated
Law of man; all here together come
From every clime; and to e'er pass the river
Are not loth. For so Heaven's justice
Goads them on that fear in them becomes desire;
Hence ne'er have passed good spirits."
So on we strayed
My guide explaining all which to my
Senses was not plain. And thus we saw
The inner lives of those who seek
The oily path to happiness and wealth.
Admired the cheek of those who sell and buy—
The prices asked by those who hold their
Breath and ask as long. Admired the fierce
Determined air of those who draw and
Those who drink the vilest poison ever
Hornstein hid from Uncle Sam.
Now, turning to my guide I downward
Look and ask him yet to grant
A sight of Minos' regions. The darkness paled.
"Of Hogan now you speak, and were the
Region minus Hogan 'twould be less a hell."
His wretched pun I noted not,
But said, "Lead on." He onward led;
Down to a chasm's brink he led the way,
And paused where sights and sounds
And smells conspire to drive the sense
Away from brain of man. Into that
Secret place he led me on, 'mid clink
Of glass and oath profane and noisome
Air our way we take, and find
Ourselves within the circle sought;
There Minos stands within his web,
Grinning with ghastly features; yet in truth
He seems as well a mannered man
As ever scuttled ship or cut a throat.
Various tongues, horrible language, outcries
Of woe, accents of anger, voices deep, anon
Hoarse, with hands together smote that
Swelled the sounds, made up
A tumult that forever whirls
Round through that air with solid
Darkness stained, like to the sand that
In the whirlwind flies. "Why is this thusness?"
I to Virgil said, "Who thus make hideous
Even hell itself?" He thus to me—
"These from Petroleum Center
And from Pittsburg here do come
To fill the measure of their evil days;
To lure their victims on to death
While they their cash transfer
To Minos' till." I wept and went my way—
Old Charon, with a look that hell
Might be ashamed of, took me
O'er the tide, and I got up and got.

We present a brace of gems of *facetiæ*, bearing upon the question of low-test oils :

New Kind of Burning Fluid.—Mr. Gray, of Boston, recently discovered a non-explosive illuminating fluid. To show how safe the new compound was, he invited a number of his friends to meet him in his rooms, whither he had brought a barrel of the fluid, which he at once proceeded to stir with a red-hot poker. As he went through the roof, accompanied by his friends, he endeavored to explain to his nearest companion that the particular fluid in the barrel had too much benzine in it, but the gentleman said he had engagements higher up, and could not wait for the explanation. Mr. Gray continued his ascent until he met Mr. Jones, who informed him that there was no necessity for him to go up higher, as everybody was coming down; so Mr. Gray started back to be with the party. Mr. Gray's widow offers for sale the secret for the manufacture of the non-explosive fluid at a reduced rate, as she wishes to raise money enough to buy a silver-handled coffin with a gilt plate, for Mr. Gray —*Exchange.*

THE *American Builder*, of Chicago, for April, contained a puff of gasoline, as an illuminator. The May number had the following:

"Good gasoline is as safe as kerosene, is cheaper, and gives a better light."

So read a "local notice" in the last issue of this magazine, but the statement is hereby retracted, with an apology to the public. We wrote candidly, and thought we were telling the truth, but have since had reason to believe that gasoline is not so safe as, in fact, almost anything else. We tried a lamp and for a week all went well, and the above notice was written; but since then there has been an explosion. Nobody was hurt, but the demoralization was extreme. The lamp contracted a habit of lighting, much in the manner a newly arrived Irishman described the sun as setting in this country, after he had heard the evening gun fired, "wid a bang." But this was considered only one of the eccentricities of genius—of the inventor—and the lamp still remained in favor, for it certainly did give a clear light. But the crisis came at last. On a recent memorable occasion the lamp, somehow, would not burn well for two or three hours, but in a single moment it made up a good average flame for the entire evening. The flame suddenly shot up to the height of a yard, and burned blue and fiercely. Frontiers were rectified, and the room vacated rapidly. Then followed an earthquake, and now the lamp has a permanent physical deformity. It is for sale.

The conclusion reached by the experiment is, that gasoline may be safe for a week, but no longer. At least, there's no depending upon it after the expiration of this time, and we cheerfully subscribe to it, as something no family should be without, where there is more of a family than the parents can honestly support.

Sand Pumpings.

Novel Method of Operating Oil Wells.

IN a previous issue we promised our readers a detailed account of the plan adopted by W. C. Stiles, Jr., of running his wells by means of an endless wire rope, by which plan a large saving is made, both in machinery and labor. The principle of transmission of power by wire rope is not recent, but its application to oil wells is entirely new, and originated with Mr. Stiles. Since, however, he has introduced it, it has come into general favor and promises a general revolution in the manner of operating oil wells; for, by this means, owners of wells can operate them with profit, when, by the present expensive system of pumping, they would have to be abandoned.

The plan adopted by Mr. Stiles is as follows: He has near the center of his oil leases, a 40-horse power, stationary engine, located in a convenient place, without any regard to the location of the wells he has drilled or proposes to drill. The power is transmitted from the engine by means of a continuous wire rope receiving its motion from a grooved sheave wheel on the main shaft of the engine, and communicating motion to a similar wheel on a distributing station, 306 feet distant. At this station two lines are now run, and three additional lines will soon be at work from the same station. One of the lines now in operation runs in a parallel line with the first mentioned rope, 306 feet, to a well now being pumped, on a main shaft of which is a similarly grooved wheel, over which the rope passes, making a total distance from the engine to the countershaft at the well, 612 feet. The other line now in operation from this station runs at right angles from the line before described to a well now being drilled, located 92 feet distant. The change of direction to right angles is accomplished by the means of small sheave wheels placed directly over a grooved wheel at the distributing station, there being at the present time three grooved wheels on the shaft at this station.

There is another line running directly from the engine to an old pumping rig located without any regard to this system. The rope runs at an angle of 60°. Four sheaves are necessary to make this angle. This demonstrates the fact that this system can be used by any one having rigs already located as the power can be transmitted to any point by the use of two or four sheave wheels. This is as far as Mr. Stiles has carried his plan into effect, but he proposes, by means of other main lines and distributing stations, to drill and pump thirty wells, scattered over an area of sixty acres. Mr. Stiles thinks that should it be necessary to pump more than that number of wells, he can do so by pumping by "heads" thirty wells at a time, which he can do by the means of his friction clutch, which we will hereafter describe, so as to pump sixty or even ninety wells during the day.

No doubt many practical oil operators who read this article will raise objection to the manner of connecting so many wells together, from the apparent fact to them, that should any repairs become neccessary to the machinery of one well it would cause them to stop all; but this is not the case. To obviate such difficulties, Mr. Stiles has invented a friction clutch, by which any well can be stopped or started without effecting any other, and by which each well is as independent of the other as if operated by separate engines.

We will endeavor to explain as well as we can without the aid of cuts how this is effected. The counter-shaft, crank, and tug wheel are the same as are now in use at all wells. The sheave wheel is loose on the shaft and on one face a ring of V shaped pieces of oak wood are inserted, which, when the well is to be started, are forced by an inclined clutch, placed on the shaft on the reverse side of the wheel into a V shaped ring of a friction head keyed to the shaft. The well can be instantly started or stopped by a lever fixed on one side of the inclined clutch.

Mr. Stiles has refused to patent this improved manner of pumping wells, and proposes to leave the plan open so all can adopt it.

The iron work was done by the well known firm of O'Brien & Bro., of this place. Mr. Stiles owes the success of his plan in a great measure to the very efficient manner in which his directions were carried into execution by Mr. Chas. A. Royce, who is superintending the works of Mr. Stiles.—*Volcano Lubricator* (*West Va*).

Parker's Landing.—A correspondent of the Pittsburg *Leader*, under date of December 18th, says:

This is from Parker's Landing, the new Eldorado, or what do you call it, of oil—a place that five years ago had three little wells, "doing," in oil phraseology, about twenty-one barrels per day, now doing one-fifth of all the Pennsylvania oil regions. Then we had no railroad nearer than Mahoning, no machine shop nearer than Pittsburg, no transportation for oil except by boats, though the latter was hardly felt.

Thousands who visit Parker, would feel interested by reading the history of the original development of the now largest oil field in the world. Like a number of other places Parker owes its existence to what may be known the speculative period in land, which raged in '46 to such an extent that land in large quantities, within a radius of fifty miles of Oil City, was bought up and sold to eastern capitalists at enormous prices. Among others was a tract of about twenty acres on the bank of the Alleghany river, about a quarter of a mile above the landing of the present ferry, which was sold by parties from Kittanning to a company in Philadelphia known as the Clarion and Alleghany River Oil Company, for a large figure—the former believing they had swindled their eastern friends beautifully, and the eastern men satisfied that they were swindled; but with commendable courage they determined in 1865 to put down a test-well in spite of the collapse of the speculative movement that had drawn them into the oil movement. They were rewarded with a well that pumped sixteen barrels a day until 1870, and is still doing four or five barrels a day.

This opened the territory; two more wells were put down a few hundred yards below the first one, but they proved to be but two or three-barrel wells, which was rather a dampener to the territory. I had forgotten to mention that in 1866 a well had been bored nearly to the third sand, about three-quarters of a mile below the original well, by the Miles Oil Company, of New

York, on a lease from Fullerton Parker to Jas. P. Tanner. No oil was got except a little from the second sand. The company, therefore, removed their machinery, and the well was abandoned until July of 1868. The removing of the machinery, and the impression that the well was deep kept the district back from the fall of 1866 until the summer of 1868, no other well starting anywhere in the vicinity in July of 1868. Some enterprising operators re-leased this well from Mr. Parker, and bored it through the third sand, succeeding in getting about an eighteen-barrel well.

To this success may be attributed the immense development which has opened before us. Without this, Parker's Landing would doubtless have stood as it was, until the price of oil, owing to its scarcity, should have advanced so as to make a two or three-barrel well an object. To-day the ground covered by this immense field is nine miles long by from two to two and a half wide. It crosses the Alleghany river in an oblique direction, and as yet neither end, but the eastern side, has been found. Parker's Landing is about the center of its belt ; its longest way and about the same in the other direction, as it crosses the river right under the town, a number of good wells being within the limits. But I shall reserve a description of the town, its buildings and its people for another time.

The First Railroad Projected in the United States.—The following extracts are taken from a contribution to the Philadelphia *North American :*

Americans, generally speaking, appear to have a very limited degree of information in regard to the history of the locomotive and of steam traveling.

Few of this day are aware that as early as 1809, twenty years before the trial trip on the Liverpool and Manchester Railway, Oliver Evans endeavored to establish a railway between New York and Philadelphia, offering to embark every dollar he was worth in the enterprise. Yet such is the fact.

There being no railways in America, Mr. Evans, in 1787, sent draughts and specifications of his plans to England by Captain Masters, of Annapolis, Maryland. In 1794–5, he sent again thither his plans by Joseph Stacy Simpson, of Boston, Massachusetts, and yet again, in 1799, he sent thither his plan by Charles Taylor. In short, from the fact that Richard Trevithick, who, in 1802, patented in England, the high-pressure locomotive, introduced into Cornwall the cylindrical flue boiler invented by Oliver Evans for his high-pressure engine, there is hardly a reasonable doubt but that he appropriated without acknowledgment the inventions of Mr. Evans.

Oliver Evans' plan for a railway was, that it "be laid so nearly level as not to deviate in any place more than two degrees from a horizontal line, made of wood or iron, or smooth parks of broken stone or gravel, with a rail to guide the carriages, so that they may pass each other in different directions, and travel by night as well as by day."

The sole reason why the locomotive was not used on rails in America years before it was in Great Britian, was because its inventor (Oliver Evans) had not of his own means sufficient to build a railway, and he could not induce Americans of his day to subscribe one dollar.

Hence it was that he aimed to run his device on turnpikes, and invited coöperation, pointing at the time to the eminent success of his elevator, hopper-boy, and his other inventions, which had revolutionized the manufacture of flour, also, to his inventions for making machine cards, as evidence of the general correctness of his views, but he failed to obtain co-operation, and, unlike the more fortunate Watt (who had enlisted for his low-pressure engine men of capital), Mr. Evans was compelled to furnish himself both the mental and and pecuniary means for those practical demonstrations which he from time to time conducted, and referring back to which, some thirty years afterward, Elijar Galloway, the British writer on steam, declared and proved Oliver Evans to be not only the true inventor of the locomotive, but also of the first practical steamboat.

Unable to move his countrymen, Mr. Evans rendered the following remarkable prophecy :

"The present generation will use canals, the next will prefer railroads, with horses, but their more enlightened successors will employ my steam carriages on railways, as the perfection of the art of conveyance. In the meantime the steam carriages may be tested, even on the present turnpikes."

As Oliver Evans died in 1819, and the above prediction was rendered several years prior to his death, none, with the events of to-day in view, can fail to remark its perfect fulfillment.

In 1802 Oliver Evans agreed with James McKeever, of Kentucky (father of the late Commodore McKeever, U. S. Navy), and Louis Valcourt, to build a boat to run on the Mississippi, between New Orleans and Natchez.

The engine (Mr. Evans' high-pressure engine) was built in Philadelphia, and the boat in Kentucky; both were sent to New Orleans, but when the engine arrived out, it was found that the boat had been destroyed by a hurricane. The engine was then set to sawing timber in New Orleans, and Mr. Stackhouse (one of the engineers), who remained with it twelve months and fifteen days, states that during that period the mill was constantly at work, his words being:

"Nothing relating to the engine broke or got out of order so as to stop the mill one hour."

This was the kind of engine sent by Oliver Evans to drive a steamboat against the current of the Mississippi, five years before Robert Fulton started the Clermont on the Hudson.

In 1803 Mr. Evans having built a dredging machine (believed to be the first worked by steam) to clean the docks of the port of Philadelphia, he embraced the opportunity to practically demonstrate that navigation by steam was feasible, by putting the engine on a scow in the river Schuylkill, and converting the scow into a stern-wheel steamboat, made to propel its way down the river to the Delaware, and thence up to Philadelphia, passing all the vessels in the river. This four years before Fulton started a steamboat.

Lubricator—Specific Gravity.—The different standards of lubricating oils, when measured by Baume's scale at a temperature of 60° Fahrenheit, range from 22° to 36° specific gravity, or weigh from seven pounds twelve ounces, to seven pounds to the gallon. The specific gravity, or weight, of an oil does not necessarily indicate its quality or value as a lubricator. It is important in determining the value of different oils of the same class or kind. Of these the heavier grades are always the best for ordinary purposes. The question of gravity is of little account, however, in comparing any particular class of oil with others of a different class, for the reason that their nature and characteristics may be entirely different, and a light oil of one class may be greatly superior in lubricating qualities to a much heavier oil of another class. As between these, quality and adaptation must be the controlling considerations. Formerly the gravity of oils was regarded as of much greater importance than it is now. The fish and animal oils were all of heavy gravity, and it was found difficult to convince consumers that a lighter oil might be equally as well, if not better, adapted to many of their uses. Even after the wonderful lubricating qualities of the hydrocarbons had been fully established, it took a long time to overcome the existing prejudice and bring them into general use.

Different qualities are required in lubricators according to the different uses to which they are to be applied, and it is always important to select such as are adapted to the work to be done.

In case of slow, heavy bearings, or any heavy machinery where the bearing surfaces work under great pressure, a heavy, sluggish oil is required, while for light and rapid motion a lighter oil should be used. Then there is a difference in the kinds of material composing the working surfaces. These range from wood and coarse wrought and cast iron to finest brass and steel, and very often all of these are found in the same machinery. A knowledge of these ever-varying conditions, as well as of the nature and quality of oils, is necessary to secure the highest results of lubrication. The gravity of lubricators is also affected to some extent by the temperature under which the machinery works; and when used on exposed surfaces, such as railroad axles, &c., should always be a little heavier in summer than in the winter. We think this is a point of some importance to oil consumers, and in England, where the changes of temperature are less than they are here, it is very generally regarded.

We were forcibly impressed with the importance of care and intelligence in the selection of lubricants, by a conversation we recently had with the superintendent of one of the largest cotton mills in the city of Lowell, Mass. He stated that by using a light lubricating oil of about 32° gravity, composed of petroleum and a small per cent. of fish oil, they were now running the same machinery and doing the same work with five water wheels that formerly, while using a heavier oil for lubrication, required six wheels. The oil previously used was a good article of the kind, but a series of carefully conducted experiments demonstrated that it was not adapted to the purpose for which it was used, and also indicated the kind of oil which was needed for the work. Hence the change of lubricators and a saving of some thousands of dollars in the cost of power. It is more than possible that by a little intelligent discrimination in the choice of oils, similar results might be attained in many other cases. We think it may safely be adopted as a maxim that the lighter the oil—provided it has just sufficient body and viscidity to keep up lubrication, the more satisfactory will be the results.—*National Oil Journal.*

How to Construct Inexplosive Lamps.—Under the above heading, J. M. Parker, Professor of Mathematics and Physics in La Grange College, Missouri, writes to the *Scientific American* as follows:

I have waited patiently for six months to see what remedy scientific men would offer as a preventive to the explosion of lamps from the use of burning fluids. I am fully convinced that the desired improvement does not lie in the direction of a change in the character of the fluids used, so much as in the manner of using it.

Carburetted hydrogen mixed with oxygen of the air will ever be explosive—no matter from what it is generated; and we must have carburetted hydrogen before we can have the light. Now, I will, by experiment, prove that a combination of hydrogen and oxygen can be exploded in any lamp, whether of glass or metal, with perfect safety, provided the outlet to the lamp is left so that the expansive forces of the ignited gases find this much the weakest part of the vessel. For instance, fill a strong glass decanter, of one quart capacity, with equal volumes of olefiant gas and oxygen. Fill over water; leave a gill of water in the bottle, and cork it with a well fitting cork. Immerse a small piece of tissue paper in naphtha or petroleum; roll in this paper one grain of potassium, so that the water left in the bottle shall not come in contact with the potassium for some minutes. When all is ready drop the paper and potassium into the bottle of mixed gases, force in the cork to a level with the mouth of the bottle, and set upon it a pound lead weight in the shape of a minie ball. The instant the potassium ignites a violent detonation takes place and your lead weight goes up 100 to 150 feet. Probably you may not find your cork; but your glass bottle is unharmed. This experiment you may repeat 100 of 1,000 times with no damage to your glass bottle. You may try the same experiment upon an ordinary glass lamp, with the same results, if you will leave off the leaden weight, using only a close fitting cork.

Now, how simple to arrange a lamp upon a perfectly safe principle! The oil vessel may be of the ordinary shape, except that the neck be long enough to hold fast the burner (made to fit it securely by grinding the glass), after the manner of a stopper. Then, should an explosion take place, the only damage that can possibly accrue will be to throw out the burner and flaming wick together, and this would not in one time in one million set fire to the fluid or break the oil vessel. Now, this is just the thing required for both economy and safety: no screw on the burner. I do not want any patent for it—nor do I want any one else to have one. I know what I say, when speaking of the safety of it, and do not care what oil is used.

A Tiip Through the Oil Regions of West Virginia.—W. H. Keelan writes to the Washington *Chronicle:* I arrived here a few days since after having visited the oil regions of West Virginia. To do that I returned by the Baltimore and Ohio railroad, a distance of 22 milles from Parkersburg, and stopped at Petroleum, where I met an old friend in the person of Colonel Van H. Bukey, who is agent of the West Virginia Transportation Company at that point. The colonel is a young man, who entered the army as a private at the breaking out of the rebellion, and rose through the different grades until he was given the command of his regiment, and received from the hands of General Phil. Sheridan, on the field of Winchester, the eagle which designates his rank. In company with him I rode horseback up Oil Creek Run about three miles, and saw the works of the company he represents. The whole region is a forest of derricks, and the clang of machinery echoes through the hills as it drives the pumps, whose arms can be seen for miles around, drawing the oleaginous fluid from "the bowels of the harmless earth." As this is drawn forth it is conveyed through miles of iron pipe, and emptied into reservoirs or vats, whence it is pumped by steam power into the tanks on the cars setting on the railroad track, and carried to any point desired. This oil is the only article the company transports, and its mode of doing so has been brought into an almost complete system. The miles of pipe have been laid, at large expense, under ground, and are connected with each well. For conveying the oil from its source to the railroad track an agreed amount is paid by the individual or company working it, and thus the name of "Transportation Company" has been taken by the corporation working it. Lying miles from the engine which runs this work, sits the oil center, known as the White Oak region, and in its center lies Volcano.

On ascending the top of the hill by the regular wagon road there appears within sight a legion of tall scaffoldings, surrounding the wells which dot the hills all around, the appearance being a perfect amphitheater crowded by a hive of busy workmen. The place contains a population of about 3,000, and has some large stores, a post-office, telegraph station, and a newspaper published weekly. This organ of public opinion is a a sprightly sheet, well patronized with advertising, and is entitled "THE VOLCANO LUBRICATOR." It is issued by George P. Sargent, Esq., and is devoted to the development of the resources of that region of West Virginia, and particularly the oil and coal.

The excitement which followed the discovery of oil in that region in 1860–61, and which was followed by large speculations in land, has, in a great measure, died out, but there is an extensive and steady amount of real work going on in the production and shipping of the crude petroleum from this and all the region surrounding and along the Little Kanawha. There is a large refinery on the Parkersburg side of the Ohio river, where a considerable amount of the crude article is made into a superior quality, the quantity being only limited to the capacity of the machinery, which is kept running day and night.—*Catlettsburg*, *Boyd County*, *Ky.*, *October* 20, 1871.

Shale Oil and Petroleum versus Coal for Fuel.—We recently, in response to an invitation from the proprietors, paid a visit to the Girard Tube Works, Twenty-third and Filbert streets, to see in operation the patent atomizing steam-generating apparatus that they have introduced into their establishment.

The apparatus is extremely simple, differing in this respect very widely from all previous methods of generating steam by coal-oil fires, and is the invention of Mr. Joseph K. Caldwell, a resident of Philadelphia.

Two tubes are placed with their mouths at right angles, the one emitting a thin jet of oil, the other a jet of similar size of superheated steam; the result of the combination is hydrocarbon gas, which burns very freely and gives out an intense heat. Both gas and steam are regulated by cocks easily managed, and so simple is the whole arrangement that the most limited comprehension can understand it, and it therefore has no technical difficulties in the way of its general introduction into our machine shops and manufactories.

The trial at the Girard Works has be made on a boiler of one hundred horse-power, in which a pressure of fifty pounds of steam was generated in one hour, or about half the time required to generate the same amount of steam with coal. The cost of heating by this means is also much below that of coal, as one barrel of crude oil costing two dollars will perform the work of a ton of coal costing six dollars. Another advantage which it offers is that there is no cutting out of clinker from the furnaces, or hauling away of ashes to be done, nor is stoking required. The steam and oil once turned on, burn until they are turned of, and thus a vast amount of labor is saved. The objection to be urged against the invention is the use of coal oil, which, on account of its explosive nature, is extremely dangerous. This, however, is easily overcome. The main tank of oil is placed at a considerable distance from the boilers, and is connected with a supplementary tank of small size by means of pipes.

The amount of oil in the smaller receptacle, regulated by means of float valves, is only a few gallons, and by means of sand kept for the purpose in close proximity, even if it does catch fire, can be easily extinguished.

There seems to be no reason against, and every reason for, the general introduction of Mr. Caldwell's patent, as it meets a need long felt amongst manufacturers as an economical substitute for coal. The following gentlemen, well known to the community, have seen the astonishing apparatus, and give it their decided approval: W. C. Allison & Sons, John Sellers, of Wm. Sellers & Co., Nathan Roland of James Rowland & Co., and numerous others.—*Philadelphia Press*, *October* 30.

How it Burned.—There have been not less than nine hundred causes assigned for the Chicago conflagration by people who, residing many miles away, and knowing nothing about the circumstances, may be supposed to be as unprejudiced as Johnson's ideal critic on the subject which they treat. A majority of the opinions attribute the calamity directly to the "wrath of God;" some assigning one cause and others the opposite for the aforesaid wrath. A Toledo opinion lays it all to petroleum, and locates the oil in the pores of our building stone. The foundation for this theory consists in a statement made in a late number of "*Silliman's Journal*," that many houses in this city are built of oil-bearing limestone found hereabouts. The sudden combustion of all buildings in the track of the fire furnishes the rest of the evidence. We don't know how the advocates of this theory will reason when they learn that the Second Presbyterian Church, the only edifice built of oil-bearing stone, is the best preserved ruin in its neighborhood, much better, for instance, than the Field & Leiter store, of Westchester marble. Perhaps they will have to fall back upon Silliman to explain that phenomenon, or else upon the wrath of God in general, leaving petroleum walls, pine pavements, the Fire Commissions, and the O'Leary cow all out of the account. The fact is, it is difficult to see how the fire, having got the start that it did at DeRoven street and again at "Conley's Patch," could have burned any less than it did. The roofs and sidings of acres of wooden buildings were dry as touchwood in the first place, and were then rendered trebly inflammable by the furnace heat with which the wind surrounded them. This wind—the hardest known here in many seasons—not only wafted brands upon all roofs, and under all cornices, and awnings, and sign-boards, through all windows, shivered by the heat, but acted as powerfully as the most powerful blow-pipe in furnishing oxygen to feed the flame. If any person wishes to see why Chicago burned, he has only to construct a small model of a store or house—made of and filled with such materials as are usually put into stores and houses—place the same in the blast furnace of an iron mill, and see how it will come out when the blast is over.

Economy of Steam Power.—We learn from our Eastern exchanges that a method of utilizing the waste heat which escapes in the exhaust pipe, and thus producing a great increase of power with the same fuel, is being very thoroughly tested at the Atlantic Works in East Boston, with engines and apparatus fitted up expressly for the purpose. So far the results of the experiments have been very satisfactory, and it is believed that in practical use a saving of one-half will be effected in the consumption of fuel to the production of a given amount of steam power, as compared with the best engines now in use. We cannot speak of the merits of this particular device, not having seen it or met with any description of it sufficiently clear to give us a correct idea of it; but the want which it claims to supply is one which has long been felt and never fully met. A means of utilizing the waste heat of the exhaust, which would admit of adaptation to any kind of engines without evolving any great expense, would prove most useful on ocean steamers, since the saving effected in fuel would enable them to make voyages with less coal and to carry proportionately more freight. The necessity for carrying such large amounts of coal as are now required, even with the most economical engines, is a difficulty most seriously felt on long voyages, and a device which, as claimed in the case of the one mentioned, really dimishes the consumption of coal by one-half, would be economical for shippers, whatever the cost of applying it.

The Filtration of Oils.—Mr. H. Stopfer, of Manchester, and Mr. P. Dean, of Leeds, have patented an invention in England, for the "filtration" or separation of oil. This invention relates more particularly to the treatment of oil, or of oleaginous or fatty matter or compounds, for such as, for example, the matter styled "foots,'" in order to separate the clear or fluid oil therefrom. In the first place the said oil or matter is subjected to a preparatory filtration, in order to remove the grosser impurities, a vacuum being formed under the filtering medium by pumping out the filtered oil or matter. The said oil or matter is then forced at a great pressure into an apparatus containing one or more filters of slate, stone or other porous substance, or combination of substances or materials, the fluid oil being forced through the said filter or filters. The invention also is applicable to the purification of beeswax. The filtering apparatus is sometimes heated.

"Gas City."—The Franklin *Spectator* has the following of this remarkable oil territory:

Of the many wonderful places in the oil region Gas City, Cranberry township, Venango county, is the most remarkable. It is called Gas City on account of the large amount of gas flowing from its wells, of which there are between thirty and forty producing. The town has about forty houses, composed principally of hardware stores, groceries, restaurants, &c., and these are all heated and lighted by the gas from one well. Each well, in addition, has gas enough to make steam for its engine and to light the engine house —and each engine house for light uses as much gas as would supply a large hotel—wastes more gas than would light a town the size of Franklin. At each well there is tubing run from the hole to some distance from the rig through which the waste gas is burned at an elevation of about twenty feet. Under this light, at this time of year, there is a green spot, of living grass, of about 200 feet in circumference, kept green constantly by the heat of the burning gas. The absence of coal gives the engine house and rigs a cleanly and attractive appearance.

Remarkable Well.—A most remarkable well in the town of Rock, near Janesville, Wis., is exciting a good deal of attention among scientific men in that region. Its great peculiarity is that it is bored through a series of stratified rocks older than the coal formation, and it is situated in a State where no coal exists. As it is admitted that oil is a produce of carboniferous formations, the question that puzzled people was, where could the oil have come from? Certainly not from the Illinois coal beds, which are near by it, because the dip of the strata, strongly defined, is from north to south, and it would be still more strange to find petroleum flowing up hill, to an outlet higher than its source, than to discover its existence in a rock where, according to geology, it had no business to be. Still there was no doubt that there was oil in the well. At last a close investigation of the unctuous fluid showed that the oil was refined petroleum, whereupon sensible observers came to the conclusion that its presence was no longer a mystery, but could be accounted for on the theory that the proprietor, who is not averse to selling, only pumping out what he had previously put in. Others less skeptical, are investing their money in the further development of this extraordinary territory, where the wells reveal refined oil.

A New Metal for Drilling Tools.—A lengthened and exhaustive series of experiments with a new alloy called phosphorous bronze, which is formed by a combination of phosphorus with different proportions of tin and copper, have proved that it is admirably adapted to resisting the concussion and strain incident to heavy ordnance, and also to the manufacture of machinery subjected to the excessive strain of violent shocks. Among the numerous purposes to which it may be applied is that of drilling tools. The alloy may also be tempered so as to resist the action of the file. It is claimed to possess elasticity, hardness, tenacity and durability, far superior to that of the best steel.

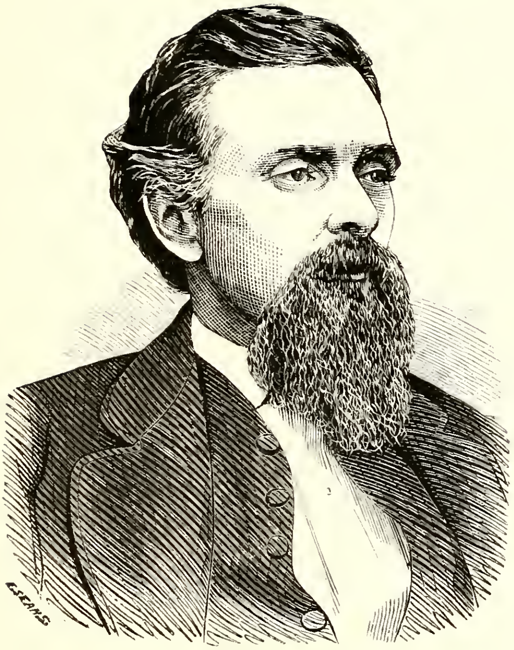
An Important Discovery.—Mr. Ashmead, agent for the Porous Water-proofing Company, located in Philadelphia, has brought to our notice this valuable discovery. For nearly seventy years the scientific world has directed its attention to the laws which render the skins of live animals water repellant, and yet allows the perspiration of the body to pass off in the form of vapor. This is a matter in which the inhabitants of the Oil regions are particularly interested. From the very nature of their employment, the great majority of men are compelled to be abroad at all seasons and in all weathers. Clothing of all kinds, including hats, boots, shoes, leather and textile fabrics, after having undergone the process, can be worn in rain or snow without the material being penetrated with moisture, while the porousness of the goods, unlike rubber, is maintained. The discovery is applicable to cordage, twine, sails, awning cloths, carpets, horse blankets, harness and many other articles. The company guarantees that the articles will not be injured in color or strength; indeed, by the governmental tests the process was found to add to woolen goods, sixteen per cent., and to cotton, linen and flax twenty-two and a-half per cent. to the strength of the fabric. The scientific secret is simply the neutralization of capillary attraction, which, if accomplished must render the articles water-proof. By arresting the dampness of the atmosphere and excluding it from the person, without checking perspiration, the process must be a matter of serious importance to persons troubled with dyspepsia, rheumatism and consumption, and an aid in recovering from the effects of these ills. At any rate, it is worthy of a thorough investigation on the part of our merchants and citizens generally. The company's factory and office is at No. 144 and 146 North Fifth street, Philadelphia.—*Register* (*Oil City*).

Editorial Notes and Reviews.

Nature and Art.

ONE of the pupils of Verocchio, Nanni Grosso, on dying in the hospital, rejected an ordinary crucifix presented to him, demanding to have one by Donatello brought, declaring that "otherwise he would die unshrived," so disagreeable to him were the badly executed works of his art.

Grosso was an enshusiastic admirer of this master sculptor Donatello, but the legend runs, that the crucifix he so contemptuously discarded was one by Ghi-



James M. Lambing.

berti, a peer of his Donatello, the master—and, in his own eyes, his masterpiece—all instinct with the finest sentiments of physical life and beauty. This is but a part of the chain of mystery running down through the art developments of all times.

The almost superhuman efforts of the artist to reproduce his most exquisite dream of beauty have again and again ended in a production combining not only all the defects of the artist's own style, but many borrowed from the peculiar faults of others. The early masters of the Italian Renaissance, the true restorers of ancient paganism as well as the Florentine anatomists, Antonio Pollaiolo, Verocchio, Luca Signorelli and all the predecessors of Leonardo da Vinci retain semblances and painful experiences in this strange mystery.

Philosophers account for it in this way: There is in all lives a moment of supreme horror or mental agony which leaves upon the tablets of the soul an impression entirely irradicable. The present memory sinks out of sight, but when the mind is ever brought to all its intensity of action, the horror or pain long past is brought into relief, and so far as may be transferred to the acts or work of the sufferer. The study of this is most interesting, but we will here drop the theory at large.

In our last number we gave a sketch of the life of Mr. James M. Lambing, and our artist furnished what purported to be a picture of that worthy gentleman. After closely studying this picture, we recalled what we above narrate, and accounted for the absence of any likeness to our friend Lambing, by the theory that the artist was under the influence of the "*evil shadow,*" which had transformed the picture in his hands into one of the noted pirate LaFitte.

In justice to Mr. Lambing we therefore reproduce his portrait *as he is*, and beg pardon for the misfortune of the last month.

The Petroleum Producers' Association.

THIS Association held its monthly meeting on Wednesday, the tenth of January.

The vitality of this organization has for some months been rather low, and fears were entertained of its entire disintegration. But with this last meeting came a revival of interest and expressions of determination which augur great things for the future.

The cohesiveness naturally incident to the producing interests and the active efforts of a very few of the leading spirits, have kept the body intact through more than one severe trial. Notwithstanding the rather large membership fee—fifty dollars—the numbers have steadily increased; but those who became members have not generally appeared deeply interested in the workings of the society, or hastened to avail themselves of the benefits arising from a thorough organization.

When we remember that this association by its membership represents several millions of dollars, and that their interests are mutual, and their opportunity for the most successful combination is without rival or precedent, we can but wonder that they have not long ago assumed the powers and position so certainly theirs by right of the latent forces they possess.

We believe they have now determined to occupy the vantage ground, and the future will show that in their union will be a strength which will laugh at opposition. And they have now gone so far in the preliminary arrangements, that they will not rest until every man who produces a gallon of petroleum becomes a member of the association, and while he reaps all the benefit of coöperation will only incur an expense commensurate with his income.

The workings of the association will thus be those of a joint stock company, wherein the voice and influence of a member will be measured by the amount of stock therein, and where any producer —*bona fide* producer—will be welcome. And the line of demarcation will be drawn so closely and accurately that no producer shall be a broker or speculator in any but the oil produced by himself, or, in other words, that no broker or speculator shall be allowed within the pales of the association.

Within the scope of the general plan of their work will come the establishment of a permanent office to be constantly occupied by their secretary, an arrangement with the telegraph companies for special rates in the transmission of news and orders to and from the home office, and the early adoption or establishment of a daily or weekly organ. At the home office all the vagaries of development throughout the entire region, will be in constant receipt—in cypher—by telegraph, and market changes or anything likely to effect the markets will be constantly at command or in possession of each producer.

We believe this is no visionary programme, but one which, by the producers, can and will be carried out.

Cost of an Oil Well.—To answer numerous queries from those residing abroad, we give estimates below which will convey a very accurate idea of the cost of a well, exclusive, of course, of the territory, upon which no estimate can be made.

Where the territory is purchased outright, it costs all the way from ten dollars to a thousand per acre.

Where leases are taken, the lessee pays, for the privilege of operating, from an eighth to a half of all the oil produced. These values and rentals are, of course, commensurate with the estimated chances of success.

The cost of putting down oil wells has varied through all the years of the history of the business. By reason of the want of appliances fitted for the work, and the inexperience of the drillers, frequent were the mishaps, sticking of tools and such like, which often resulted in the total abandonment of the work engaged upon. Experience and the improved facilities offered by the many valuable inventions, have almost entirely obviated the difficulties which the operator of a few years ago had to contend with. Wells range in depth from 500 to 1,300 feet, consequently they vary in cost. The expenses of rig, machinery, and drilling, are about as follows:

Rig	$400	to	$500
Engine and Boiler	750	"	900
Casing	250	"	500
Tubing	300	"	600
Sucker rods	75	"	125
Fittings	150	"	200
Drilling (contract)	750	"	1,500
Labor, &c	50	"	85
Total	$2,725	to	$4,410

The above estimates cover the cost of the first well. If a second well be put down contiguous to the first, the latter can be drilled and pumped by the same boiler.

The figures which we give may be considered a fair average of the cost of puting down wells.

Is the Natural Supply of Petroleum Exhaustible ?—This is an everyday question with those engaged in the production and refining of petroleum. It is a question of deep interest to every one, no matter how remotely connected with oil mining. Men of thought and scientific research (?) have considered the subject, and no matter how unwilling we may be to receive their verdict, it has been declared by them that our staple is exhaustible. The weight of scientific evidence is against the theory of constant generation of petroleum, and yet it is the prevailing opinion that petroleum is in course of formation or distillation at the present time. It is claimed by those who hold this opinion, that old wells long since abandoned have revived and produced oil; but *how many such* out of the many thousands of abandoned wells and for how long a period? We answer, few indeed, and those few produced but for a brief space of time. Acknowledging that pretroleum is the product of constant evolution, generated in the earth laboratory, still it may become practically exhaustible should the consumption exceed the production—just as the annual fruits of the earth are exhaustible when the production is exceeded by the consumption.

It is only within a few years that oil has been extracted from the earth on this continent. Then its accumulation in past ages would, or at least should, have overflowed its rocky reservoirs and caused an inundation of oil long geologic eras since, were it in course of constant generation. That there is a definite quantity of coal, iron ore, silver and gold stored away in the bowels of the earth no one doubts, and that it is so with petroleum no one can disprove.

Locally gold, coal, iron, etc., *are* exhaustible; *generally* they may be considered inexhaustible, as almost daily we are adding to our knowledge of the extent of new fields of precious metals; and so with petroleum. And though many years may pass away before the present oil fields shall have been exhausted, other States than Pennsylvania, other countries than this one, shall "pour forth rivers of oil."

Casing Oil Wells with Cement.—It has often occurred to us that cement might be used in oil wells as casing for the purpose of shutting off water. The cost of casing is a heavy item to oil operators, and it would be a matter of much importance to them if cement could be used for the purpose we have mentioned.

It would seem that two difficulties present themselves, viz.: First, to find a cement which will harden under the influence of water, and secondly, to properly apply cement to the walls of a well.

We have noticed that in England the difficulty of finding a cement having the property of hardening in water, combined with durability, has long since been overcome. The sea-walls or breakwaters on the coast of England, built to protect extensive districts from the inroads of the ocean, were greatly damaged at times by the heavy gales which rage along the coast. The sea forced itself into the interstices between the bricks or stone, thus undermining the structure. Some years ago Captain Cochrane, of the Royal navy, induced the engineer of one of these walls to try a cement made of bitumen, found on one of his estates in Trinidad. One ton of this bitumen is mixed with nine tons of gravel and a little gas-tar and lime, and experiments show that the tenacity with which this bituminous cement adheres to stone, iron, brick, or wood, and the rapidity with which it sets, are so great that when once joined and the material broken with a hammer, the fracture is generally through the bricks or stone in preference to the film of cement.

We are of opinion that some such cement as we have described could be used with advantage in the casing of wells. Let our inventors try, and we are confident they can attain the desired result.

Reports of the
PETROLEUM PRODUCERS' ASSOCIATION.

SYNOPSIS.

	Dec. 1871.
Number of barrels of oil on hand at the wells at the close of the month	127937
Number of barrels of oil delivered from wells during the month	468302
Aggregate of oil on hand and delivered during the month	596239
Deduct number of barrels of oil on hand at the close of preceding month	118279
Balance showing the production for the month	477960
Average production per day for the month	15418
Number of wells producing during the month	3775
Average daily production per well during the month	4
Number of wells being drilled	394
Number of new wells commenced during the month	111
Number of wells completed during the month	191
Number of wells abandoned during the month	131
Number of abandoned wells resumed during the month	21
Capacity of iron tankage in barrels	1486944

Statement of Daily and Monthly Production, beginning Jan., 1870.

	1870.		1871.	
	Production per day.	Production per month.	Production per day.	Production per month.
January	11287..6	349918	13497	418406
February	11714	327991	13306..3	372578
March	11299	350291	12914	400335
April	12294..2	368828	12866	385996
May	13211..9	409569	13187	408797
June	13731..6	411949	13678..8	410364
July	13735..6	425807	14725..3	456485
August	16776..7	520078	14922..1	462586
September	18462..8	553884	15398..2	461946
October	18171	563300	15653..7	485265
November	16953..2	508597	15487..4	464623
December	15178..4	470553	15418	477960
Average per day and Total for Year	14413	5260765	14261	5205341

Report of Shipments and Stock.

SHIPMENTS REDUCED TO 43 GALLONS PER BARREL.

	Refined.	Crude Equal.	Crude.	Totals.
O. C. & A. R. R.	41,948	59,926	88,616	149,542
A. & G. W. R. R.	55	78	74,411	74,489
A. V. R. R.	18	26	79,715	79,741
J. & F. R. R.	17	24	100,522	100,546
P. & E. R. R.	0	0	6,504	6,504
By River	0	0	0	0
Total	42,038	60,054	350,768	410,822

Stock at Wells December 31 118,279

Total Shipments for Nov. (bbls.) 480,977

☞ In reducing Refined Oil to "Crude Equal," as per above table, we calculate on the basis that 100 bbls. of Crude produces 70 bbls. of Refined.

Exports from the United States.

	Dec. 2d to Dec. 31st, '71.	Dec. 2d to Dec. 31st, '70.	Jan. 1st to Dec. 31st, '71.	Jan. 1st to Dec. 31st, '70.
New York (galls.)	6807176	6953280	94955850	87667299
	Dec. 3rd to Dec. 31st, '71.	Dec. 3rd to Dec. 31st, '70.	Jan. 1st to Dec. 31st, '71.	Jan. 1st to Dec. 31st, '70.
Boston (galls.)	141495	132960	2185096	1790271
Philadelphia (galls.)	2778478	3066844	56803261	49414814
Baltimore (galls.)	129312	14137	2570528	1729921
Totals (galls.)	3049285	3213941	61558885	52935006

	1871	1870	Increase.
Total Exports from the United States (galls.)	156514735	140602305	15912430

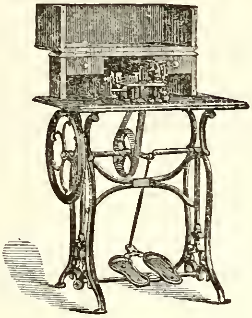
FRED. WILSON, Secretary.

JUST OUT!

THE NEW

WHEELER & WILSON

Sewing Machine.



THE WHEELER & WILSON SEWING MACHINE COMPANY, having had eighteen years' experience in manufacturing and selling Sewing Machines, and employing the ablest mechanical talent in this country and in Europe, now offer to the public

THE NEW MACHINE,

Confident that it possesses all the advantages which experience has shown to be essential to a PERFECT Sewing Machine.

The principle is the same as in the old Wheeler & Wilson Machine, but changes have been made which increase its efficiency, while at the same time, less care and skill are required in its management. Seams are crossed with ease. The work guided with scarcely an effort. Nearly double its former power. No under-tension to manage. Every joint can be tightened as fast as it wears.

Over 580,000 have been Manufactured

100,000 MORE

WHEELER & WILSON MACHINES

Have been sold for family use than of any other make. We recommend our customers in the country to purchase their machines direct from our Agents, as the price is the same as at our offices, and they can thus secure, at their homes, the necessary instructions. **AGENTS WANTED.**

Wm. Sumner & Co.,

General Agents for the Western States, No. 6 Reed Block, Erie, Penna.

J. C. SPARKS, AGENT, OIL CITY, PA.

CRESCENT TUBE WORKS.

EVANS, DALZELL & CO.,

PITTSBURG, PENNA.

DEALERS WILL CALL ON

E. W. STRATTON.

OFFICE:

Room No. 4 Parshall Block,

SPRING STREET,

TITUSVILLE, PA.

PETROLEUM IRON WORKS.

BRYAN, DILLINGHAM & CO.,

Machinists, Iron & Brass Founders, Forgers,

MANUFACTURERS OF

Engines, Boilers, Drilling Tools,
Circular, Mulay and Sash Saw Mills,
Pumping Rig, Walking Beam & Band Wheel Irons,

WHOLESALE AND RETAIL DEALERS IN

TUBING & CASING FOR OIL WELLS,

Stuffing Boxes, Clamps, Swivels, Tongs, Brass and Iron Fittings for Steam and Gas, Working Barrels and Valves of every kind, Snows Patent Liquid Packing Pump, with the late improvements.

IN ADDITION TO THE ABOVE WE HAVE IN FULL OPERATION A

BRASS FOUNDRY AND BRASS FURNISHING ROOM

Where we do all kinds of Brass Work.

☞NOTE.—Especial attention is called to our

NEW BOILER SHOP,

And its HEAVY MACHINERY for building TANKS, STILLS, BOILERS, and making all NECESSARY REPAIRS.

N. B.—SOLE MANUFACTURERS OF

Guillod's Celebrated Steel Jars,
Crocker's Patent Check Valve, and
Griffin's Patent Water Packer,

NOW IN GENERAL USE.

ROBERTS' PATENT SAND PUMP,

Bly's Patent Sucker-Rod Adjuster.

WE ALSO FURNISH THE

LONG HOOK AND WOOD CONNECTIONS,

AT COST PRICE, WHOLESALE AND RETAIL.

All orders will be filled at short notice by

BRYAN, DILLINGHAM & CO.,
Titusville, Pa.

TORPEDOES.

THE

ROBERTS PETROLEUM TORPEDO COMPANY,

OFFICE AT RED PLANING MILL,

Corner of Pine and Second Streets,
Titusville, Penn'a.

Owing to the large and increasing demand for the Roberts Torpedoes, and the late decision of the Commissioner of Patents, in refusing to Wm. Reed a patent, and the decision of Judge R. C. Grier, sustaining the Roberts Patent, they have lowered the price of their Torpedoes TWENTY PER CENT., so that every operator can afford to try a Torpedo before abandoning a well.

LIST OF AGENTS.

Titusville, Church Run and vicinity,	H. H. Thomas, or Stephen Roof, Titusville, Pa.
Shamburg and vicinity,	George Irwin, Shamburg, Pa.
Enterprise, Pleasantville, Bean Farm and Pithole,	Goorge W. Van Vliet, Pleasantville, Pa.
Tidioute and West Hickory,	Charles Clark, Tidioute, Pa.
Petroleum Centre and vicinity,	Levi Mason, Petroleum Center, Pa.
Tarr and Blood Farms, Rouseville, Cherry Run and vicinity,	James Saunders, Tarr Farm, Pa.
Franklin,	Z. Wilber, Franklin, Pa.
Scrubgrass and Parker's Landing,	Richard W. Redfield, Scrubgrass, Pa.
West Virginia, Ohio and Kentucky	T F. Cook, Parkersburg, West Va.

R. J. BOTTNER,

WATCHMAKER AND JEWELER,

AND DEALER IN

Jewels, Watches, Diamonds,

JEWELRY & CLOCKS.

CENTER STREET,
OIL CITY,

MAIN STREET,
ROUSEVILLE.

JAMES TYSON,

AGENT FOR

ALLISON & SON'S

Tubing & Casing.

LARGE CASING A SPECIALTY.

Five and three-sixteenths, five and five-eighths and six and a quarter inch. Also, one-eighth, one-fourth, three-eighths, one-half, one, one and a quarter, one and a half and two inch

Reading Weld Butt Pipe,

To which we especially call the attention of operators.

BEST MANUFACTURE OF WELL FITTINGS.

EXPANSION JOINTS.

ROUSEVILLE.

THE EXCELSIOR LIFE INSURANCE CO.

OF NEW YORK.

HOME OFFICE:

Nos. 68 & 70 WILLIAM STREET, NEW YORK.

CHAS. N. MORGAN, President.
BUTLER WARD, Secretary.

I. H. Hilliard, Gen'l Agt. for Penna.

OFFICE—N. E. COR. FIFTH AND WALNUT STS.,

Philadelphia, Pa.

This Company has all the usual Endowment Plans of Insurance used by other good companies, and in addition to the Endowment Plan, all **Policies can be converted into Cash in Five Years** from the date thereof, at the option of the Policy holder. Even the ordinary Life Policy is convertible into cash in the same time, thus making all policies Endowment Policies, and also removing the general objection to Life Insurance, viz.: *investing your money where you can never use it yourself.*

SEND FOR CIRCULAR.

AGENTS WANTED THROUGHOUT THE STATE WHERE THE Territory is not Already Taken Up.

BOSTON IRON WORKS,

JAMES SMITH, Proprietor,

OTTER STREET, NEAR J. & P. RAILROAD,

FRANKLIN, PENNA,

Manufactures Oil Well Rig Irons, Casing Heads or Stuffing Boxes Plows, and all kinds of Castings, Drillings, Drilling Tools, &c. Also sole manufacturer of the

Morahan and Roberts Sand Pumps.

THE

TITUSVILLE MORNING HERALD,

ESTABLISHED JUNE 14, 1865,

Is the acknowledged organ of the Petroleum interest of the United States. Its current reports of the developments throughout the oil territory in the United States and Canada; its daily review of the market and list of actual sales; its telegraphic reports of the market at Pittsburg, Cleveland, Philadelphia, Baltimore, New York and European marts, together with its "Monthly Report," make it a necessity to every man engaged in the Petroleum trade, either as an Operator, Broker, Refiner, Merchant, or Exporter. It publishes the full Associated Press reports, the general and local news of the day. The Weekly Edition is an epitome of the daily edition.

TERMS:

Daily, per annum	$10.00
Weekly	2.00
Monthly Report, in form of a Circular	1 50

The Monthly Report is published in both the Daily and Weekly.
Address

BLOSS BROS. & COGSWELL.

TITUSVILLE, PENNA.

W. W. BLOSS, } *Editors.*
H. C. BLOSS, }
C. C. LEONARD, *Oil Reporter.*
J. H. COGSWELL, *Business Manager.*
Titusville, Pa., Nov. 1st, 1870.

FOSTER & BROTHERS,

REAL ESTATE AGENTS,

Office in Plumer's Block (Up-Stairs),

Liberty Street, Franklin, Penna.

REAL ESTATE BOUGHT AND SOLD, HOUSES RENTED, TAXES PAID FOR PARTIES RESIDING AT A DISTANCE, AND ALL BUSINESS PERTAINING TO A REAL ESTATE AGENCY PROMPTLY ATTENDED TO. SPECIAL ATTENTION GIVEN TO OIL LANDS, OIL LEASES AND OIL INTERESTS GENERALLY.

Franklin, Pa., Insurance Agency,

$100,000,000.00

OF CAPITAL REPRESENTED.

Life Companies:

Mutual Life of New York,	$45,000,000.00
Railway Passenger Accident,	365,000.00

Fire Companies:

Ætna, of Hartford,	$ 5,782,635.00
Home, of New York,	4,575,000.00
Ins. Co. of North America,	3,000,000.00
Franklin, of Philadelphia,	3,000.000.00
Germania, of New York,	1,100,000.00
Security, of New York,	2,250,000.00
Pacific, of San Francisco (gold),	1,700,000.00
Lycoming, of Pennsylvania,	5,400,000.00
Peoples, of Worcester, Mass.,	850,000.00
Liverpool and London and Globe (gold),	17,000,000.00
Royal, of Liverpool (gold),	8,000,000.00

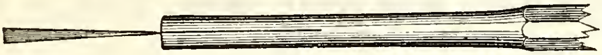
And other first-class companies. All kinds of Insurance at reasonable rates. Oil insured in store and in transit—in the very best companies. We also make dwelling and farm risks a specialty.

FOSTER & BROTHERS.
Franklin, Pa.

WILLIAM J. INNIS & CO.,

OIL CITY, PA.

DO General Blacksmithing and Machine Work.



3

SUCKER ROD JOINTS.

EXPLANATION OF CUTS.

No. 1.

The Joint complete.

No. 2.

A longitudinal sectional view of a full Joint, showing the position of the wood in the socket when wedged, a glance at which must convince the most skeptical of the superiority of this Joint over any other.

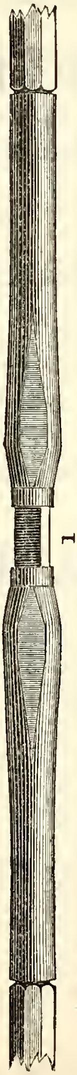
No. 3.

A view of the end of the Rod, when turned ready for the socket to be driven on, with the slot for the wedge, and the wedge about being entered.

No. 4.

Represents the end of the wood, and shows the proper way to saw the slot (across the grain) into which the wedge is to be driven.

The above description and accompanying cuts will enable any skilled person to make connection at the wells in a much shorter time than can be done with any other Rod, all the tools required being a small, fine saw, one of our *hollow augers* and wedges, which can be had at any hardware store *gratis*.



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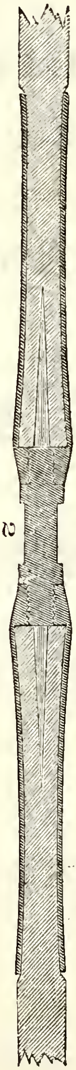

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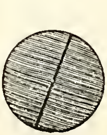

4

MAKE DRILLING TOOLS.

REPAIR STEAM ENGINES.

AUGUST SIMON,

Merchant Tailor,

BISSELL'S BLOCK,

Center Street, Oil City, Pa.

Constantly receiving new and elegant varieties of Season Goods. All the latest styles

ENGLISH MELTONS & CHEVIOTS,

Beavers, Doeskins, Cloths and Cassimeres,

Elegant Suiting, Fancy striped Cassimeres for Pantaloons. The best stock of

GENTS' FURNISHING GOODS

in the City, at the lowest prices. Satisfaction guaranteed

VALVE CUPS.

IMPORTANT TO OIL OPERATORS.

THE ROUSEVILLE VALVE CUP,

(*MILLER'S IMPROVED*)

Is the BEST cup ever made—because made from the best Oak and Union stock, either hard or soft, and without heat.

Address,

J. HOWARD MILLER,

ROUSEVILLE, PENNA.

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H. W. BROWN, General Manager.

A. H. McKELVY, Treasurer.
T. E. STRUTHERS, Secretary

ESTABLISHED, 1851.

INCORPORATED, 1871.

Brown & Struthers' Iron Works,

FOUNDERS AND MACHINISTS,

WARREN, PA.

MANUFACTURERS OF

ENGINES & BOILERS,

FROM 8 TO 150 HORSE POWER.

OIL ENGINES A SPECIALTY.

Our patterns are made with especial reference to the wants of Oil Operators; they secure

DURABILITY, SIMPLICITY, ECONOMY.

These Engines are heavily built, with 3¾ inch centre connections; shaft and everything in proportion.

WILL OUTLAST

Without getting out of order, TWO COMMON, cheaply constructed machines.

THE BEST IS CHEAPEST.

Great economy in fuel a second strong point. The best operators use them. Orders received daily from all parts of the oil region. All work guaranteed.

WE ALSO MANUFACTURE

CIRCULAR SAW MILLS,

BARLOW'S ROTARY CUTTING, MULAY AND GANGS,

FOR THE UNITED STATES.

AND ALL MACHINERY FOR LUMBERING OR TANNING BUSINESS.

BROWN & STRUTHERS.

K. Brett & Sons, Agents, Titusville, Penna.

Oil Creek and Alleghany River Railway.

NORTHWARD TRAINS.

Stations.	1st CLASS.			2d CLASS.		
	5	3	1	19	11	9
		P. M.	P. M.	A. M.	A. M.	
Irvineton	....	12.10	5.10	6.00	7.35	....
Tidioute.......	....	12.55	5.50	7.28	9.35	....
Tionesta.........	....	1.39	6.30	8.50	11.30	....
Oleopolis	....	2.14	7.00	10.15	1.00	....
Oil City ... AR	A. M.	2.43	7.25	10.05	1.50	A. M.
DE	6.00	2.50	7.30	11.30	2.05	9.45
Rouseville	6.14	3.05	7.47	12.10	2.30	10.05
Pet. Cenr..AR	6.30	3.25	8.10	1.05	3.25	10.30
Titus'lle.. AR	7.10	4.07	8.55	2.55	5.05	11.15
DE	7.30	4.15	9.12	3.05	....	11.25
Corry...........	8.55	5.40	10.30	6.00	....	12.55

SOUTHWARD TRAINS.

Stations	1st CLASS.			2d CLASS.		
	4	2	6	12	20	10
	A. M.	A. M.	P. M.	A. M.	A. M.	P. M.
Corry	6.10	10.55	6.00	....	8.00	1.15
Titusv'le AR	7.30	12.25	7.25	....	11:15	2.40
DE	7.37	12.45	7.35	5.50	11.35	2.55
Pet. Cen'r AR	8.20	1.25	8.20	7.20	12.45	3.43
Rouseville	8.47	1.49	8.50	8.25	2.30	4.26
Oil City... AR	9.05	2.05	9.10	8.50	2.50	4.50
DE	9.12	2.12	....	9.12	3.10	......
Oleopolis.......	9.42	2.45	....	10.15	3.58	......
Tionesta........	10.17	3.18	....	1.30	5.02	......
Tidioute	11.02	4.00	....	1.40	6.30	......
Irvineton	11.50	4.45	....	3.20	7.55	......

JOHN PITCAIRN, Jr., General Manager.

Alleghany Valley Railway.

Southward.	Accm	Exps.	Exps.	Accm.	Exps.
	a. m.	a. m.	p. m.	p. m.	p. m.
Titusville	....	7.37	12.45	....	7.35
Oil City.........	7.15	9.45	2.25	4.00	9.30
Franklin	8.00	10.25	3.02	4.40	10.20
Foxburg	10.05	12.20	4.40	6.55	12.50
Parker's	10.15	12.50	5.10	7.05	1.05
Kittanning.....	....	3.00	6.48	9.10	3.34
Pittsburg	....	6.00	8.55	....	6.40
	a. m.	p. m.	p. m.	p. m.	a. m.

Northward.	Exps.	Accm.	Accm.	Exps.	Exps.
	a. m.	a. m.	p. m.	p. m.	p. m.
Pittsburg	7.50	....	....	8.20	11.50
Kittanning.....	10.05	7.05	....	11.40	2.30
Parker's	11.41	9.15	6.00	2.15	4.25
Foxburg	11.55	9.25	6.10	2.30	4.40
Franklin	1.55	11.40	8.35	5.00	6.50
Oil City.........	2.50	12:20	9.15	6.00	7.25
Titusville	4.57	....	....	7.10	8.55
	p. m.	p. m.	p. m.	a. m.	a. m.

☞ Silver Palace Sleeping Cars on Night Express Trains, both ways between Pittsburg and Corry.

J. J. LAWRENCE, General Superintendent.

Philadelphia and Erie Railway

EASTWARD.	WESTWARD.
Mail Train leaves Erie......................11.25 a.m.	Mail Train leaves Philadelphia......... 6.20 p.m.
" " " Corry..................... 1.10 p.m.	" " " Corry..................... 1.15 p.m.
" " arrive at Philadelphia... 6.30 a.m.	" " arrives at Erie.............. 2.50 p.m.
Erie Express leaves Erie................. 9.00 p.m.	Erie Express leaves Philadelphia......12.30 p.m.
" " " Corry................10.35 p.m.	" " " Corry................ 6.10 a.m.
" " arrive at Philadelphia... 3.30 p.m.	" " arrives at Erie.............. 7.40 a.m.
Warren Accom. leaves Erie.............. 4.00 p.m.	Warren Accom. leaves Warren.......... 7.25 a.m.
" " " Corry............ 6.15 p.m.	" " " Corry......... ... 9.00 a.m.
" " arrives at Warren...... 7.40 p.m.	" " arrives at Erie.........10.28 a.m.
Kane Accom. leaves Erie.................. 7.50 a.m.	Kane Accom. leavas Kane................ 2.05 p.m.
" " " Warren.............12.15 p.m.	" " " Corry................ 6.05 p.m.
" " arrives at Kane........... 2.05 p.m.	" " arrives at Erie............. 8.10 p.m.

Mail East connects East and West at Erie with L. S. & M. S. R. W. and at Corry and Irvineton with Oil Creek and Alleghany R. R. W.

Mail West with West bound trains on I. S. & M. S. R. W. and at Corry and Irvineton with Oil Creek and Alleghany R. R. W.

Warren Accommodation East and West with trains on I. S. and M. S. R. W. East and West and Corry with O. C. and A. R. R. W.

Erie Accommodation East at Corry and West at Corry and Irvineton with O. C. and A. R. R. W.

WM. A. BALDWIN, General Superintendent.

L. S. & M. S. Railway.

FRANKLIN DIVISION.

LEAVE OIL CITY.				ARRIVE AT OIL CITY.		
Mix'd	Mail	Franklin Accom.		Franklin Accom.	Mail	Mix'd.
P. M.	A. M.	P. M.		A. M.	P. M.	P. M.
....	9.00	4.40	..........Oil City, East side..........	8.40	3.35	....
2.05	9.15	5.00	..........Oil City W. side.	8.15	3.15	12.20
2.22	9.24	5.10	.... Reno.	8.05	3.07	12.04
2.54	9.38	5.28	.... Franklin.	7.50	2.54	11.44
3.36	10.01	....	.... Waterloo.	....	2.28	10.39
4.32	10.33	....	.... Stoneboro.	....	1.55	9.24
5.38	11.12	....	.... Salem.	....	1.17	8.02
6.10	11.30	....	.... Jamestown.	....	1.00	7.30

CHARLES F. HATCH, Gen. Sup't. GEO. H. McINTIRE, Sup't.

Pennsylvania Central Railroad.

EASTWARD—THROUGH TRAINS.	WESTWARD—THROUGH TRAINS.
Leave Union Depot.—Pacific Express....2.50 a.m.	Arrive at Union Depot.—Mail Train......1.65 a.m.
" " Mail Train..........7.35 a.m.	" " Fast Line........1.35 a.m.
" " Cincinnati Ex....12.50 p.m.	" " Cin. Express...8.20 a.m.
" " Philadelphia Ex.. 5.20 p.m.	" " Southern Ex...9.10 a.m.
" " Fast Line.......... 7.20 p.m.	" " Through Pass.1.35 p.m.
	" " Pacific Ex......2.05 p.m.
	" " Way Pass......8.20 p.m.

Cincinnati Express, Pacific Express and Brinton Accommodation, No. 2, leave daily. Pacific Express, leaving Pittsburg at 2.50 a.m., arrives at Harrisburg at 11.35 a.m.; Philadelphia, 3.40 p.m.; Baltimore, 3 p.m.; Washington, 5.05 p.m. Cincinnati Express, leaving Pittsburg at 12.50 p.m., arrives at Harrisburg 10.35 p.m.; Philadelphia, 3.05 a.m.; Baltimore, 2.30 a.m.; Washington, 5.50 a.m. Philadelphia Express, leaving Pittsburg at 5.20 p.m.; arrives at Harrisburg, 2.30 a.m.; Philadelphia, 6.40 a.m. Fast Line, leaving Pittsburg at 7.20 p.m.; arrives at Harrisburg at 3.55 a.m.; Philadelphia, 8.05 a.m.; Baltimore, 7.20 a.m.; Washington, 10.00 p.m.

A. J. CASSATT, General Sup't., Altoona, Pa.